DOCUMENT RESUME

ED 133 210 SE 021 872

AUTHOR Haakonsen, Harry O., Ed.; Schaefer, Larry, Ed.
TITLE Geosystems and Land Use Decision Making and Open Space and Land Use Decision Making. [2 Units].
INSTITUTION Area Cooperative Educational Services, New Haven, Conn. Environmental Education Center.
SPONS AGENCY Office of Education (DHEW), Washington, D.C. Office of Environmental Education.
PUB DATE 75
NOTE 116p.; For related documents, see SE 021 868-882; Not available in hard copy due to marginal legibility of original documents
AVAILABLE FROM E-P Education Services, c/o ACES, 800 Dixwell Avenue, New Haven, CT 06511 ($30.00 - price includes tape and slides)

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS *Community Planning; *Earth Science; *Environment; Environmental Education; Higher Education; *Instructional Materials; *Land Use; Secondary Education; *Units of Study (Subject Fields)

ABSTRACT

Included in this set of materials are two units: (1) Geosystems and (2) Open Space. Each unit includes student guide sheets, reference material, and tape script. A set of 35mm slides and audiotapes are usually used with the materials. The unit on Geosystems introduces the student to geosystems and the role of geosystems in the land use decision making process. The materials emphasize Connecticut situations, but can be adapted to other localities. The unit on Open Spaces provides several perspectives on the nature, function, and importance of open space areas, reviews agencies and laws that focus on man's need for open space, and includes a plan for action. (RH)

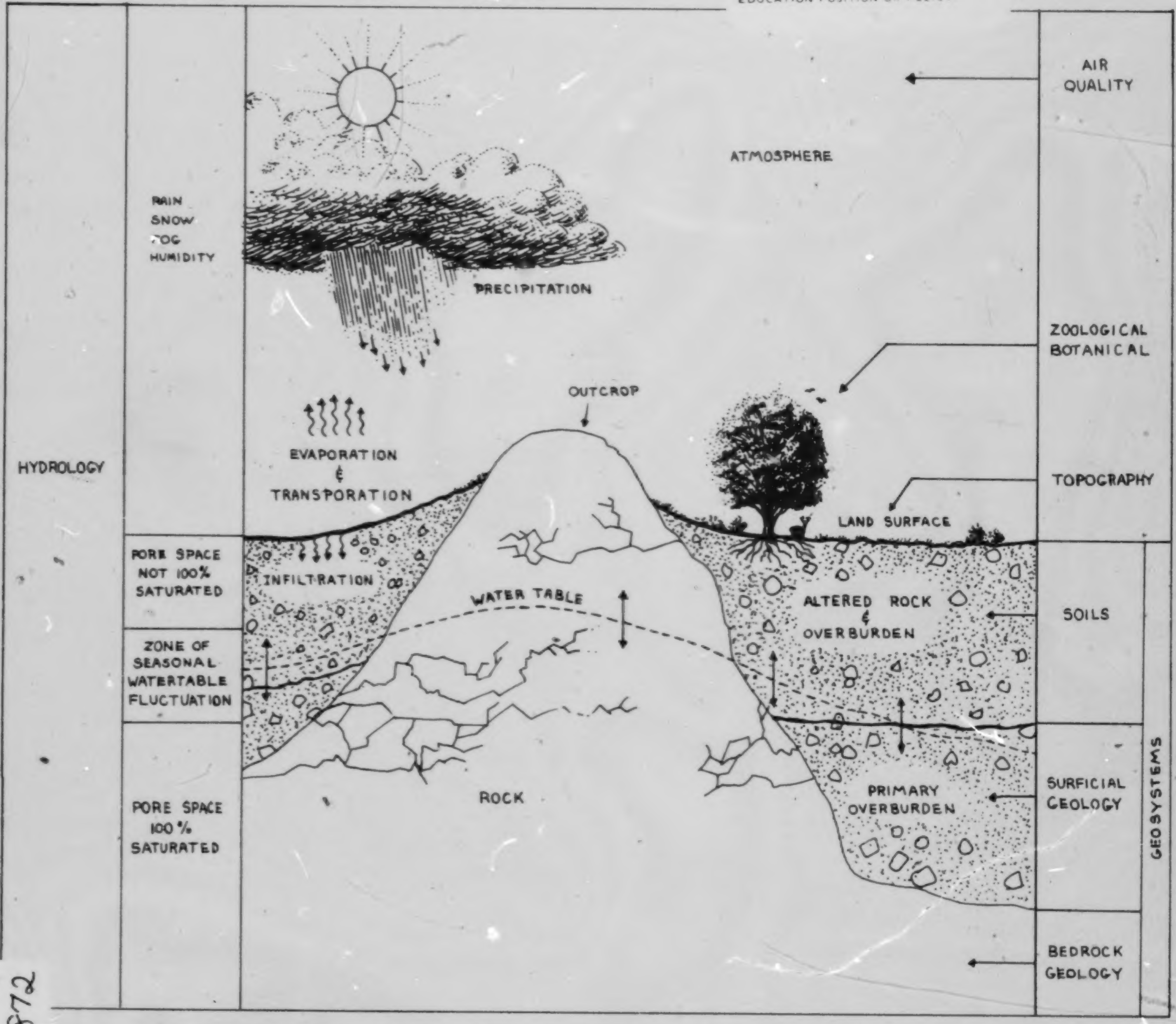
****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED133210

GEOSYSTEMS

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY


HYDROLOGY
RAIN
SNOW
FOG
HUMIDITY
PORE SPACE NOT 100% SATURATED
ZONE OF SEASONAL WATERTABLE FLUCTUATION
PORE SPACE 100% SATURATED
ATMOSPHERE
PRECIPITATION
EVAPORATION & TRANSPORATION
OUTCROP
INFILTRATION
WATER TABLE
ROCK
LAND SURFACE
ALTERED ROCK & OVERBURDEN
PRIMARY OVERBURDEN
AIR QUALITY
ZOOLOGICAL
BOTANICAL
TOPOGRAPHY
SOILS
SURFICIAL GEOLOGY
BEDROCK GEOLOGY
GEOSYSTEMS

SOURCE: CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

SE 021 872

GEOSYSTEMS

AND LAND USE DECISION MAKING

WELCOME TO THE UNIT ON GEOSYSTEMS!

BEFORE YOU BEGIN, assemble the following materials

from the kit:	on your own:
cassette tape	pencil
geosystem guide sheets	scrap paper
surficial geology map	

Insert the first slide, turn to guide sheet #1, and start the tape recorder.

Unit Designers: Chris Garlasco
Chuck Dauchy
Larry Schaefer

Unit Editors: Harry O. Haakonsen
Larry Schaefer

CREDITS

Grateful acknowledgement is made to the following organizations for their review of the unit and/or their permission to use illustrations or keys. In a great many cases, we have incorporated readers suggestions into the unit, but in others we have not. The ultimate responsibility for all statements must of course, rest with the designers and editors. We thank:

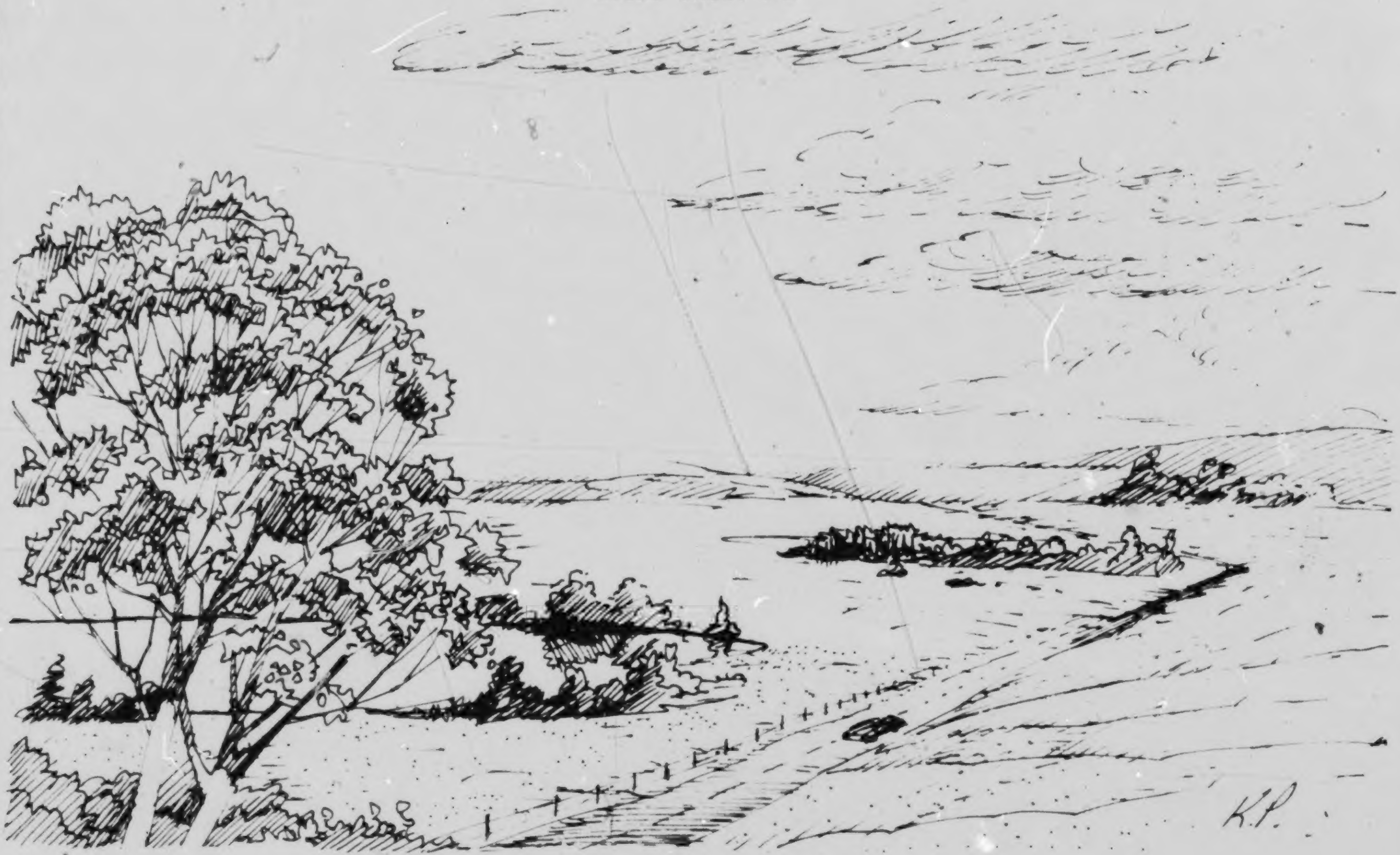
THE SOIL CONSERVATION SERVICE

THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION

The project presented herein was performed pursuant to a grant from the U.S. Office of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred.

THIS MATERIAL IS PRINTED ON PAPER MADE FROM RECYCLED FIBERS AT DIAMOND INTERNATIONAL CORPORATION, HYDE PARK, MASSACHUSETTS MILL.

GUIDE SHEET #1

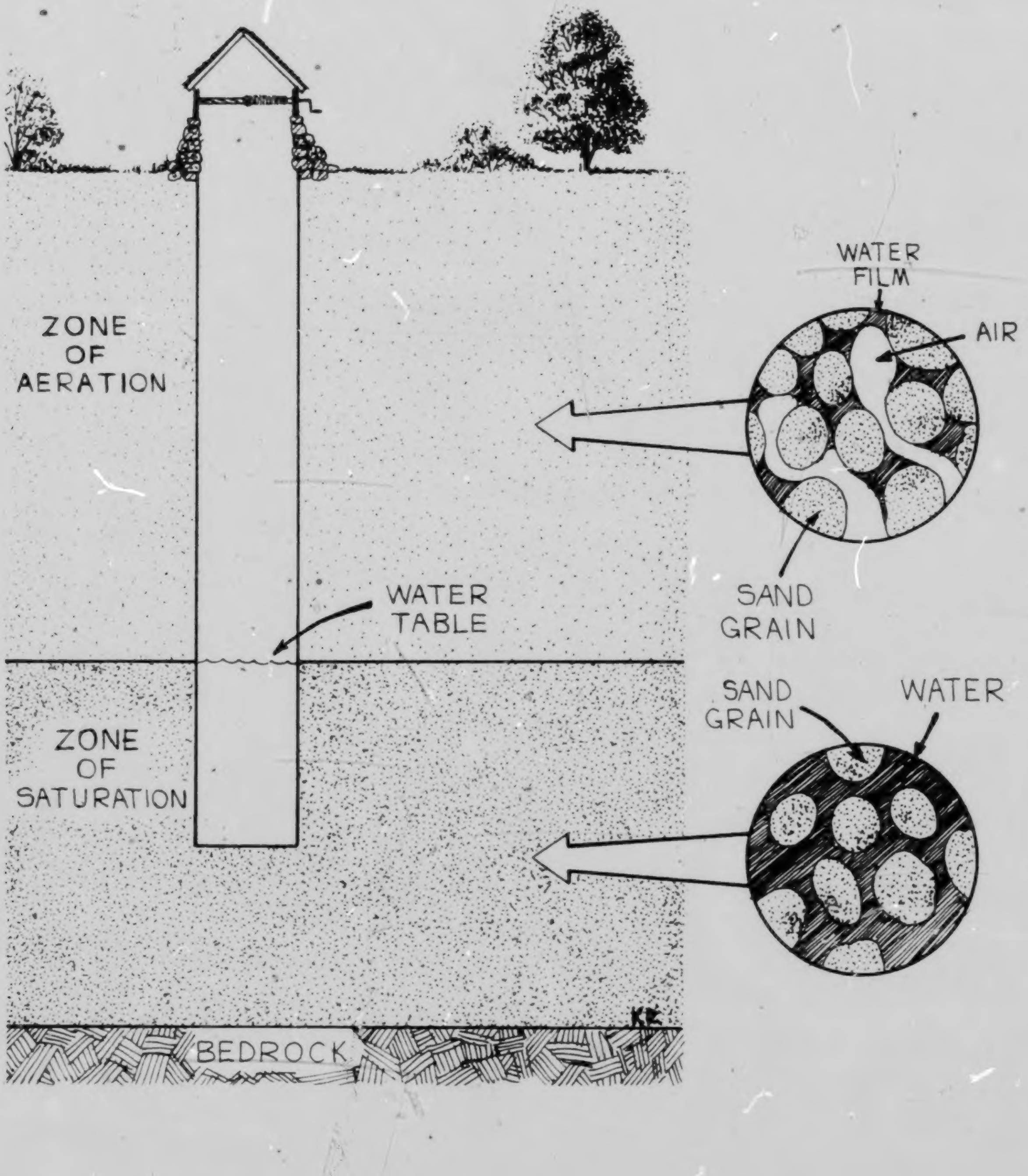


*You have just been given the task of developing the site shown in the sketch above. What kind of structure(s) are you going to build? ____________ Before starting construction what buildability factors should you consider? Make a list in the space provided.

*BE A RECYCLER YOURSELF. WRITE YOUR COMMENTS, NOTES, AND ANSWERS ON SCRAP PAPER INSTEAD OF THESE GUIDE SHEETS. IN THIS WAY, THESE GUIDE SHEETS WILL BE AVAILABLE FOR THE NEXT PERSON IN YOUR COMMUNITY WHO WILL BE MAKING USE OF THIS UNIT.

Guide Sheet No. 2

DIAGRAM OF GROUNDWATER


ZONE OF AERATION
WATER FILM
AIR
SAND GRAIN
WATER TABLE
ZONE OF SATURATION
SAND GRAIN
WATER
BEDROCK
KE

Groundwater is the water that lies beneath the ground surface, fully saturating the enclosing sand or rock. The subsurface area occupied by the ground water is termed the zone of saturation. In a well penetrating the zone of saturation, water will stand at a level marking the position of the water table. The zone of aeration lies above the water table. In the zone of aeration, the space between the pores in sand or bedrock contain air and water films. The water in this zone is called capillary water, since it clings to surfaces by capillary tension and thus resists the force of gravity.

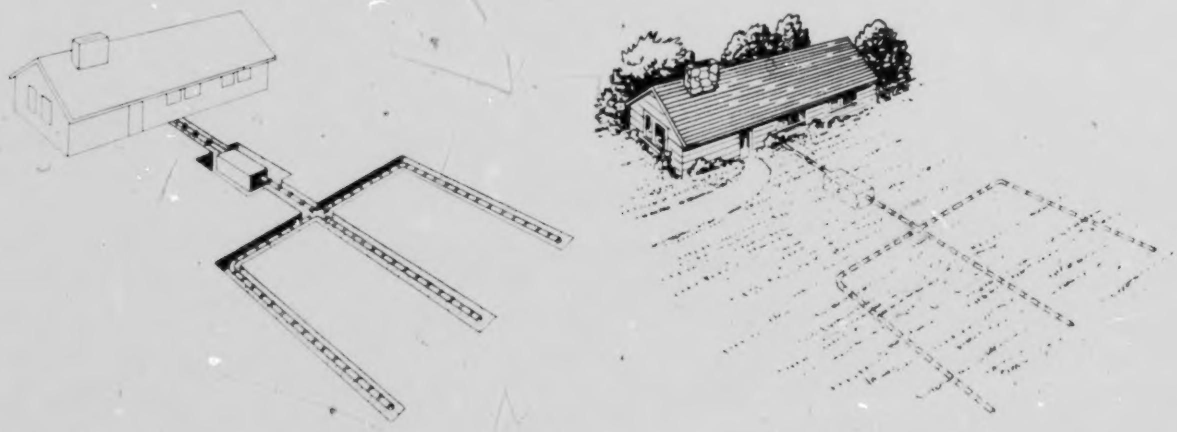
Return to the narrative after studying this guidesheet. **Turn the tape recorder on.**

GUIDE SHEET #3

SEPTIC TANK SEWAGE DISPOSAL SYSTEM

If a builder does not have access to a public sewage disposal system, he will probably utilize an on-site sewage disposal system. This requires a septic tank and leaching field. The sewer line from the house will lead to an underground septic tank in your yard. The septic tank acts as a settling and decomposition tank. The overflow from this tank, flows to the leaching field. The leaching field is a large area of trenches with draintile or perforated pipes. The trenches are usually covered with soil and planted with grass so that the septic system is not visible.

After the overflow sewage enters the leaching field, the fluid leaves the pipes and enters the soil. While the sewage fiters or "percolates" through the soil, it is cleansed by soil organisms and minerals. Eventually, a relatively clean liquid returns to the watertable. Periodically, solids must be physically removed from the septic tank.



Source of Illustration: Agriculture Information Bulletin 349. Soil Conservation Service, U.S. Department of Agriculture.

Return to the narrative after you have studied the guide sheet. Turn the tape recorder back on.

GUIDE SHEET # 4

OBJECTIVES:

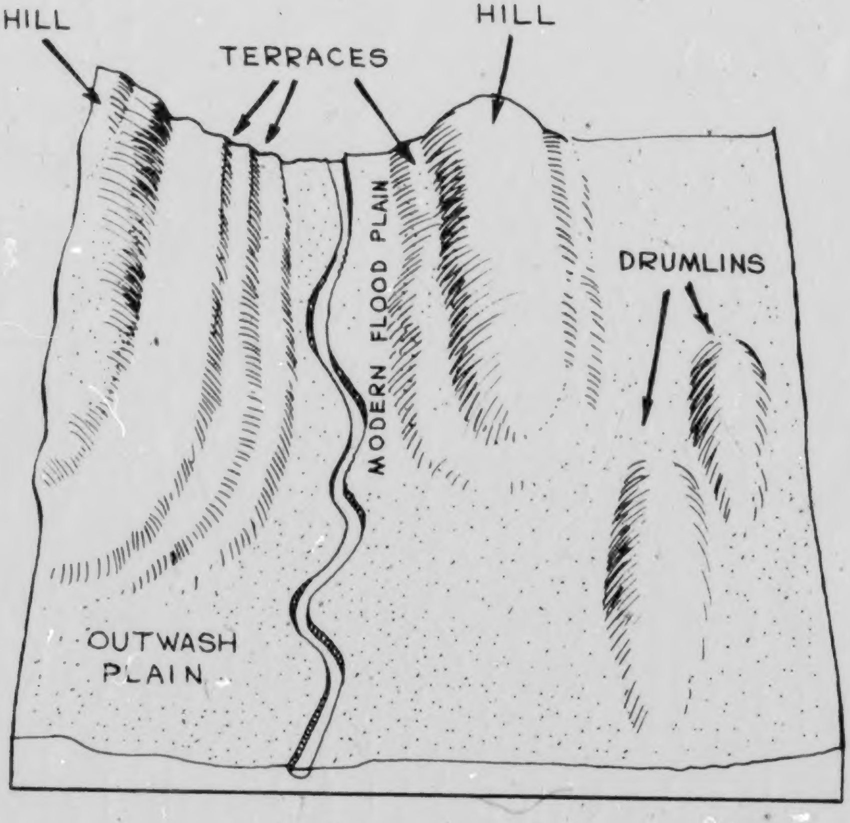
This unit is designed to present information on soil formation and the aspects of geosystems which must be considered in the process of land use decision making. More specifically at the conclusion of this unit you will be able to:

1. Describe the role of glaciers in formation of Connecticut highlands, drumlins, terraces and outwash plains.
2. Demonstrate the procedure for calculating the slope of a specified parcel of land.
3. Describe the use of contour lines for determining the elevation and contours of a land area.
4. Identify flat areas and areas of steep slope on a topographic map.
5. Compare and contrast the horizons of a soil profile.
6. Describe the physical characteristics of sand, clay and silt.
7. Compare and contrast soils with high and low bearing capacity.
8. Interpret soil maps using appropriate keys to define soil series, soil types, percent slope, rockiness, erosion condition, depth to bedrock and water table.
9. Describe the procedures for conducting a percolation test on a potential building site.
10. Utilize a percolation rate chart to classify a soil phase as fast, probably fast, probably slow or slow percolating soil.
11. Discuss problems that are encountered in building on a slope.
12. Utilize a chart of agricultural capability to identify areas on a soils map which are prime agricultural areas.
13. Utilize a key for depth to water table to identify water saturated soils.
14. Describe the soil characteristics that are required for an on site septic system.
15. Evalvate the suitability of various soils for a land use given the percolation rate, depth to watertable, agricultural capability, depth to bedrock, and slope.
16. Read and interpret a surficial geology map.

Return to the narrative after you have studied the guide sheet. Turn the tape recorder on again.

GUIDE SHEET # 5

LAND FEATURES OF CONNECTICUT



GLACIER - A flowing mass of ice.

TILL - Unstratified glacial drift deposited directly by the ice and consisting of clay, sand gravel, and boulders intermingled in any portion.

DRUMLIN - Long, smooth cigar shaped low hills of glacial till, with their long axes parallel to the direction of ice movement.

TERRACE - Relatively flat, horizontal, or gently incline surfaces which are bounded by steeper slopes.

OUTWASH PLAIN - A plain resulting from the deposition of sands and gravels by a stream originating from glacial meltwater.

FLOODPLAIN - The lowland that borders a river, usually dry but subject to flooding when the stream overflows its banks.

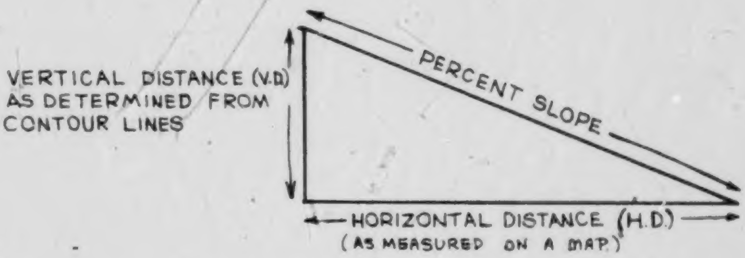
HILLS - Areas where elevation is between 200 and 2,000 ft. and where slopes of over 5 percent predominate.

Guide Sheet No. 6

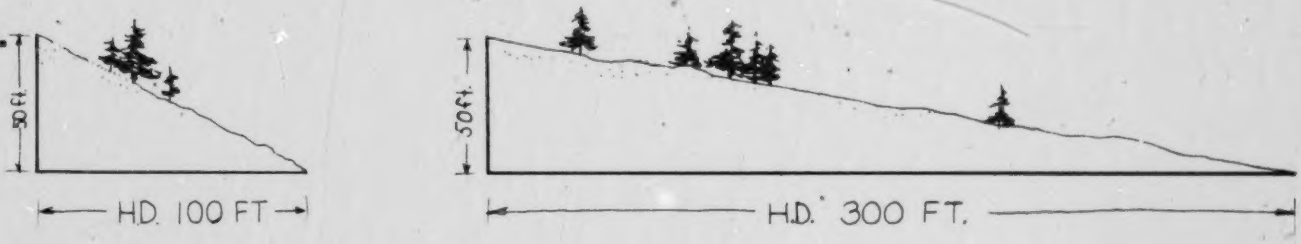
SLOPE

A. Measuring the amount of slope:

$$\% \text{ slope} = \frac{V.D.}{H.D.} \times 100$$


VERTICAL DISTANCE (V.D.) AS DETERMINED FROM CONTOUR LINES
PERCENT SLOPE
HORIZONTAL DISTANCE (H.D.)
(AS MEASURED ON A MAP)

B.

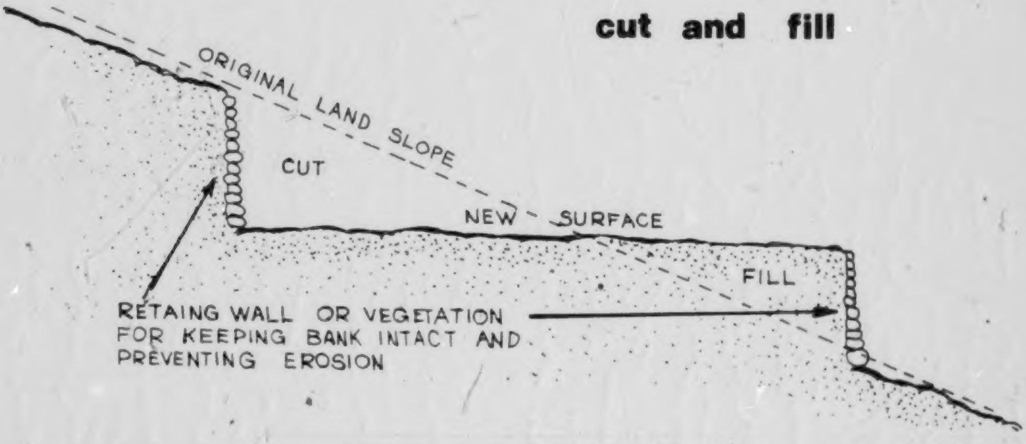

50 ft
H.D. 100 FT
50 ft
H.D. 300 FT.

Which slope is steeper? Remember % slope= $\frac{VD}{HD}$ X 100.
Obviously A is steeper than B because the land rises to a high point over a short distance. B is not as steep because the land gently rises to the same elevation. But, what is the % slope of A compared to B? Compute the % slope for each diagram and check the answers at the bottom of this guide sheet.

TURN THE TAPE RECORDER ON AGAIN WHEN YOU HAVE FINISHED PART A AND B

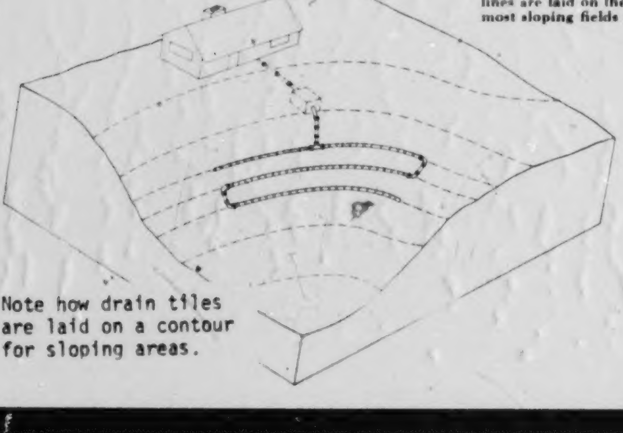
C.

cut and fill

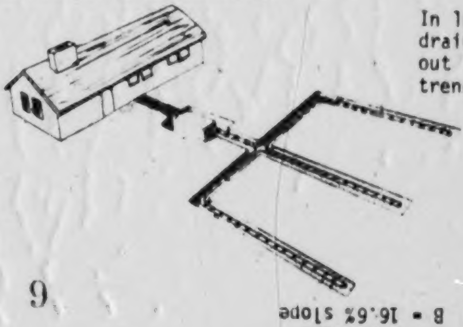

ORIGINAL LAND SLOPE
CUT
NEW SURFACE
FILL
RETAING WALL OR VEGETATION FOR KEEPING BANK INTACT AND PREVENTING EROSION

D. Diagram of two Designs for a Septic Tank, sewage disposal system.

In constructing a septic-tank sewage disposal system on sloping land, the tile lines are laid on the contour. Serial distribution, as shown above, is necessary on most sloping fields or in fields where there is a change in soil type.



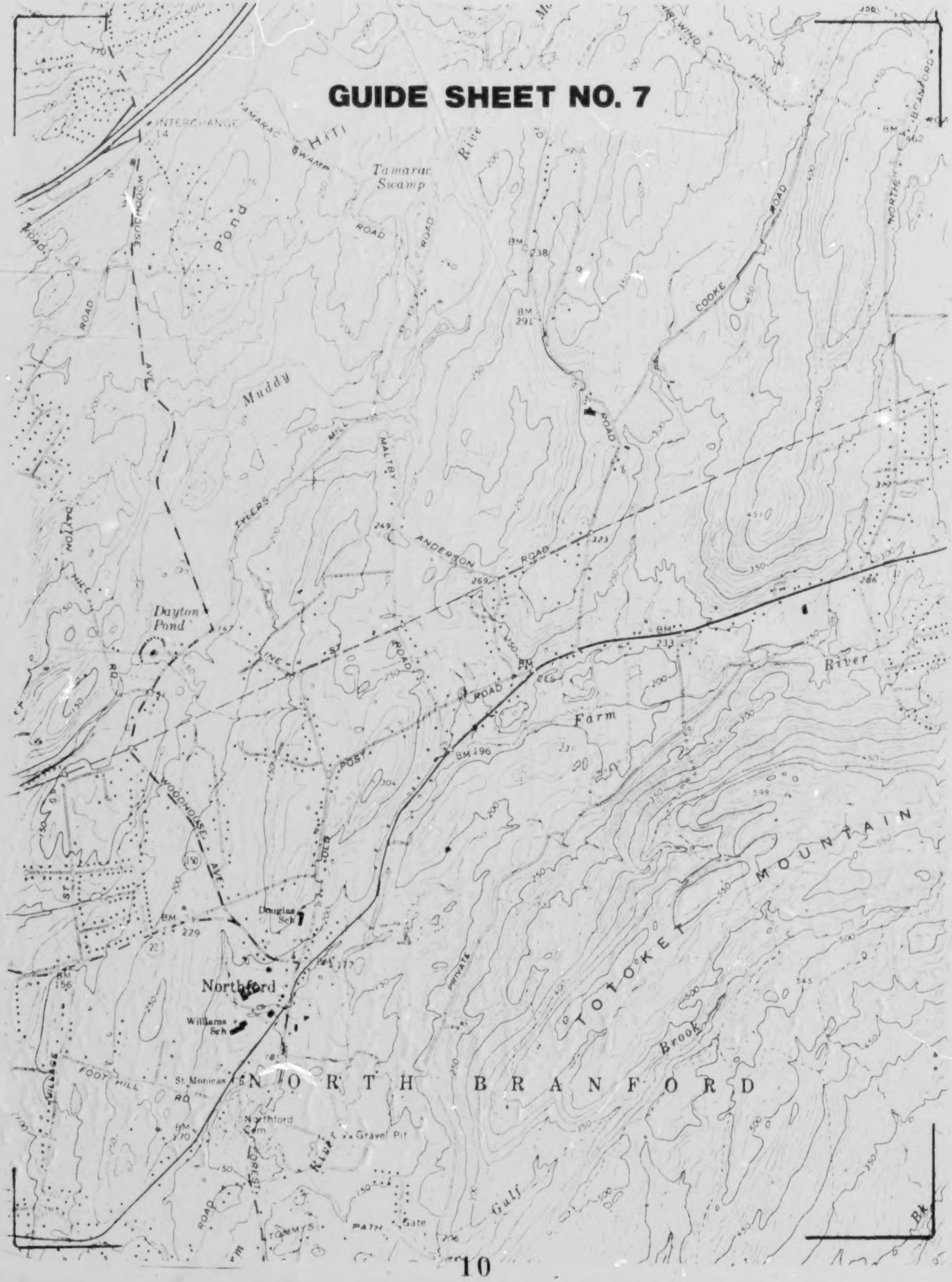
Note how drain tiles are laid on a contour for sloping areas.



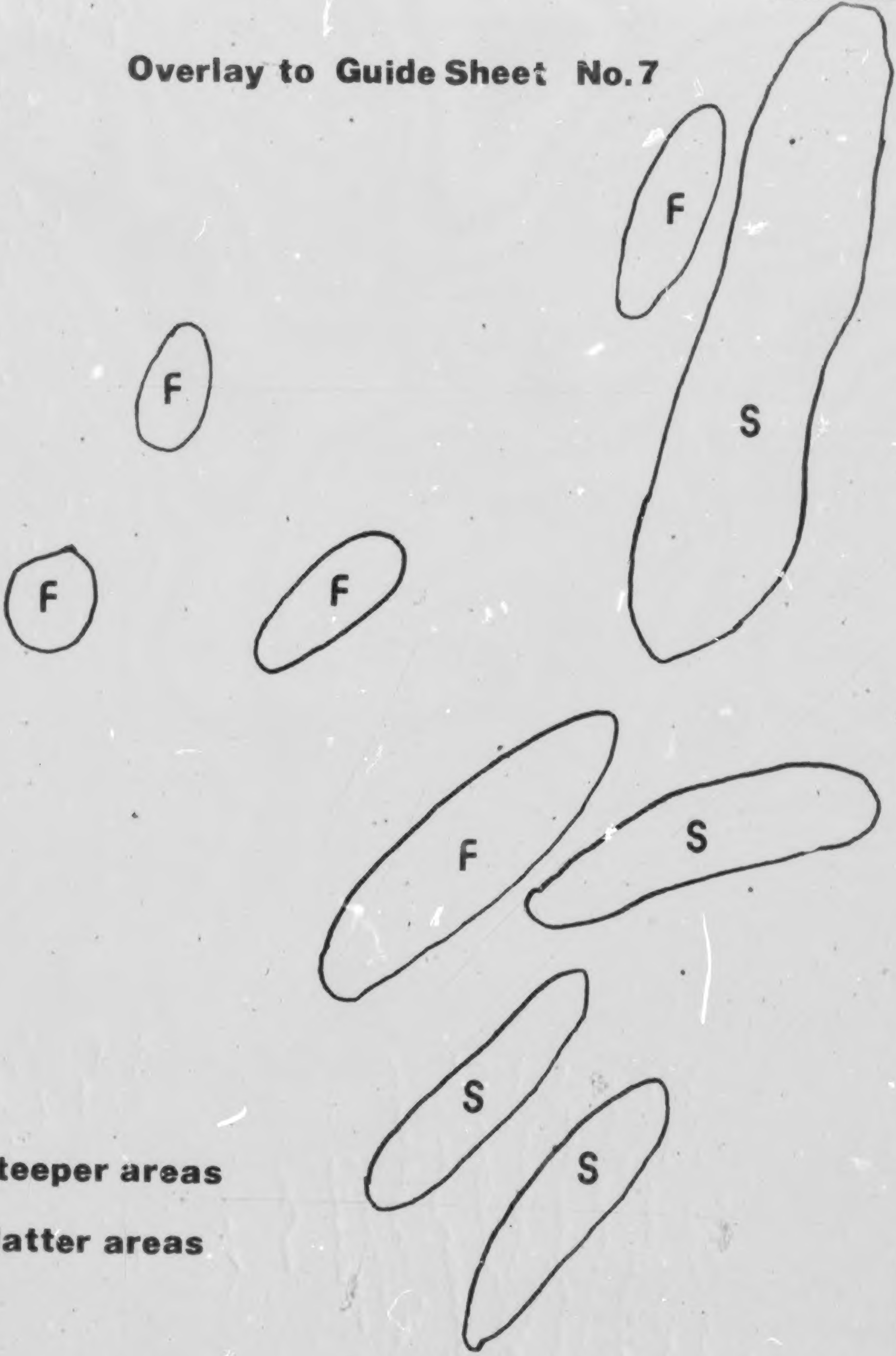
In level areas, the draintiles are laid out in straight trenches.

Answer to Part B: A = 50% slope
B = 16.6% slope

GUIDE SHEET NO. 7


INTERCHANGE 14
TAMARAC SWAMP
Hill
Tamarac Swamp
Pond
ROAD
River
BM 238
BM 291
COOKE ROAD
NORTH BRANFORD
BM 462
WOODHOUSE AVE
Muddy
MILL
MALTBY
TYLERS
249
ANDERSON ROAD
323
451
350
269
286
DAYTON HILL RD
Dayton Pond
LINE ST
ROAD
BM 233
River
BM
Farm
POST ROAD
BM 196
304
OLD
WOODHOUSE AVE
150
599
TOTOKET MOUNTAIN
BM 229
Douglas Sch
177
PRIVATE
BM 156
Northford
Williams Sch
Brook
FOOT HILL RD
St Monicas
NORTH BRANFORD
BM 170
Northford Cem
Gravel Pit
River
Gulf
FOREST
ROAD
TOMMYS PATH
Gate
200
545
Bk

Overlay to Guide Sheet No. 7

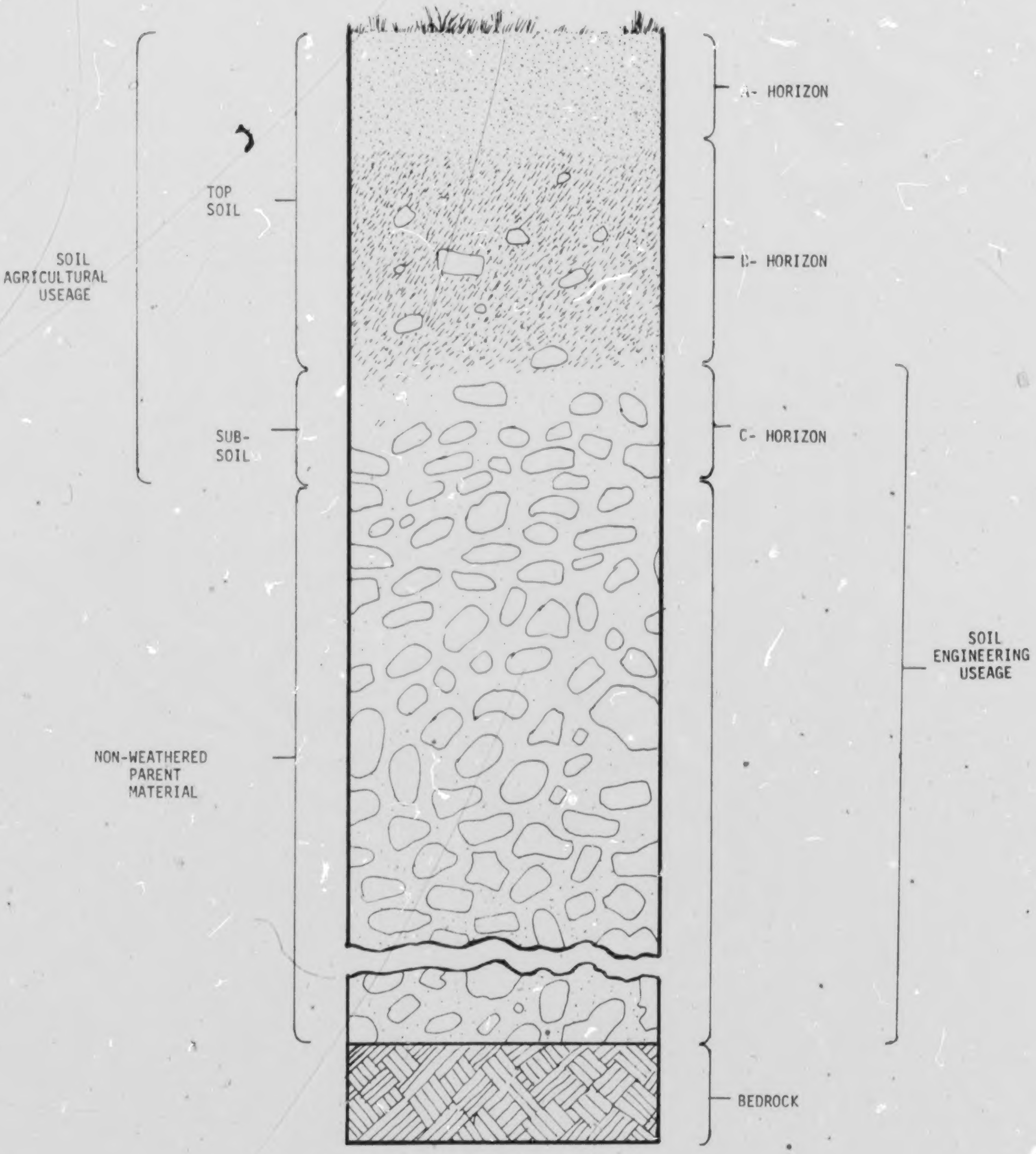


S - steeper areas

F - flatter areas

Guide Sheet No. 8

SOIL PROFILE


A- HORIZON
TOP SOIL
SOIL AGRICULTURAL USEAGE
B- HORIZON
C- HORIZON
SUB-SOIL
SOIL ENGINEERING USEAGE
NON-WEATHERED PARENT MATERIAL
BEDROCK

SOIL PROFILE DEVELOPED IN A GLACIAL TILL

GUIDE SHEET #9

A. SOME GENERALIZATIONS ABOUT SOIL COLOR

Dark Soils - indicate a great deal of organic matter present. (Pale brown to Black) This is often the case with topsoil because of the amount of decaying vegetation covering its surface.

Reddish or Yellowish - indicates presence of iron and manganese compound. Redder soils indicate well drained soils and thus better aeration. Our red Connecticut Valley soils are derived from sandstone parent material high in iron content.

Grayish or Whitish - caused by great amount of water present in the soils. Also greater amount of clay or carbonates of lime or magnesium. If the soil is a blue gray color, it is poorly drained. This is due to a particular form of iron present which has reacted chemically with the water.

B. BASIC CATEGORIES TO DIFFERENTIATE SOIL TEXTURES

SAND - Particles are larger than other classes - .05 to 2.9 millimeters in diameter - shows no stickiness when wet. Water holding capacity is low because of the large pore spaces between sand particles which allows water to drain from the soil.

SILT - Very small particles, hard to see with the naked eye. (.002 to .05 mm) Finer in texture then sand, which means fewer pore spaces are available, thus water movement through the soil is slower. The soil may clump together when wet. Silt soils are called "heavy soils."

CLAY - Finest and smallest soil particles are called clay (smaller than .0002 mm) Clay particles tend to be flattened and fit together in a sandwich like arrangement. This causes very slow water and air movement through the soil so that water may become trapped within a clay layer. Clay soil is very gritty, when it is wet - it forms lumps very easily, it is often sticky in nature.

C. EFFECTS OF TEXTURE

	Water Holding Capacity	Looseness
Sand	Poor	Good
Silt	Best	Good
Clay	High (Low Availability to Plants)	Poor

When you are through studying this guide sheet return to the narrative. Turn the tape recorder back on!

GUIDE SHEET #10

DECODING THE SOIL SURVEY

A. Soil Series - is the designation or name of a soil based on the town in which it was first located.

Soil Type - is the soil series or name of soil plus the description of the soil's texture. This is a subdivision of the soil series based on the A- Horizon.

Soil Phase - a combination of the soil name, the soil texture and the slope of that area or the soil type plus the description of the slope of that area in which the soil is found.

B. RELATIONSHIP BETWEEN MAPPING UNIT, SOIL SERIES, SOIL TYPE, AND PHASE

	Soil name	Soil texture	Soil slope	Map Symbol for Published maps	Map Symbol for Working Maps
SOIL SERIES	Ninigret			N	--
SOIL TYPE	Ninigret	+ fine sandy loam		Nn	1526
SOIL PHASE MAPPING UNIT	Ninigret	+ fine sandy loam	0-3%	NnA	1526-A

C. DECODING THE SOIL SURVEY MAPS

	Published Survey	Preliminary Survey
Soil Type Soil Series Name	Capital Letter indicates soil type. Example: H Holyoke, Nn Ninigret, C Charlton	number indicates soil type. example: 94 Holyoke, 1526 Ninigret, 32 Charlton
Rockiness of soil	x - rocky y - very rocky z - extremely rocky	L - very rocky M - Extremely rocky
Slope	A 0-3% slope E 25-35% slope B 3-8% " BC 3-15% " C 8-15% " DEF 15-35% " D 15-25% "	same as Published Survey
Erosion	1. slight erosion not significant 2. moderate erosion △ - undifferentiated areas where variable degrees of erosion occur (symbol used only where soil eroded otherwise omitted)	

Sample Soil Series Legend

M - Merrimac sandy loam
Pb - Paxton fine sandy loam
Do - Dover fine sandy loam
Es - Enfield silt loam
H - Holyoke silt loam
W - Woodbridge fine sandy loam
Nn - Ninigret fine sandy loam
Ca - Charlton fine sandy loam

D. Test your ability with Soil Survey Symbols. Write out the long hand version of each soil symbol. The names of the soil series you will need are listed above. The first one is completed as an illustration.

MyC - Merrimac very rocky sandy loam, 8 to 15% slope

PbD2

Do

HzE

WzA .

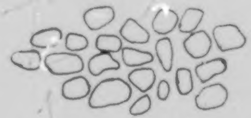
The answers can be found on the bottom of guide sheet #13

Turn the recorder on again when you have completed the exercise.

GUIDE SHEET #11

A. CONTRASTING PERMEABILITY

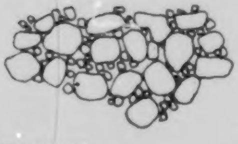
1.



Relatively Permeable material

These particles are fairly uniform in size. There is a great amount of space between the particles. Water will move through relatively rapidly.

2.



Relatively Impermeable material

Here the larger particles are surrounded by smaller particles and perhaps bits of organic debris. The spaces for water movement are drastically decreased. This material is less permeable to water.

B. PERCOLATION TESTS

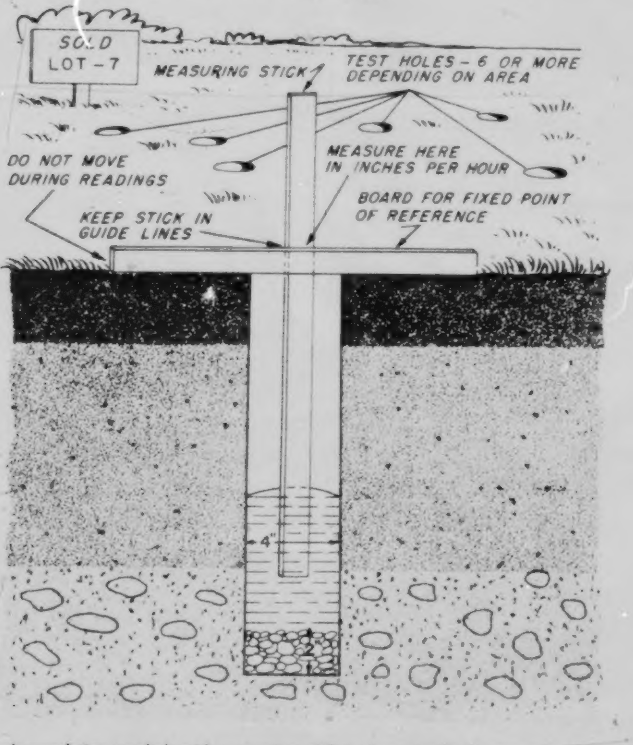
Percolation test can be helpful in determining the absorption capacity of the soil and in calculating the size of the absorption field. The tests results can vary with seasons, soil moisture, and sites. Soil phase is not the sole determinant of percolation rate. Soil scientists usually recommend. that a test be performed on the actual site during the wet season to determine the minimum capacity of the area for an on site sewage disposal system. The next section of the guide sheet outlines a percolation test procedure. It is recomended that anyone actually interested a percolation test contact the Soil Conservation Service or other qualified person for technical procedure.

1. Dig several test holes 4 to 12 inches in diameter and about as deep as the planned leaching field. Space holes throughout field. Add 2 inches of sand or fine gravel to prevent sealing.

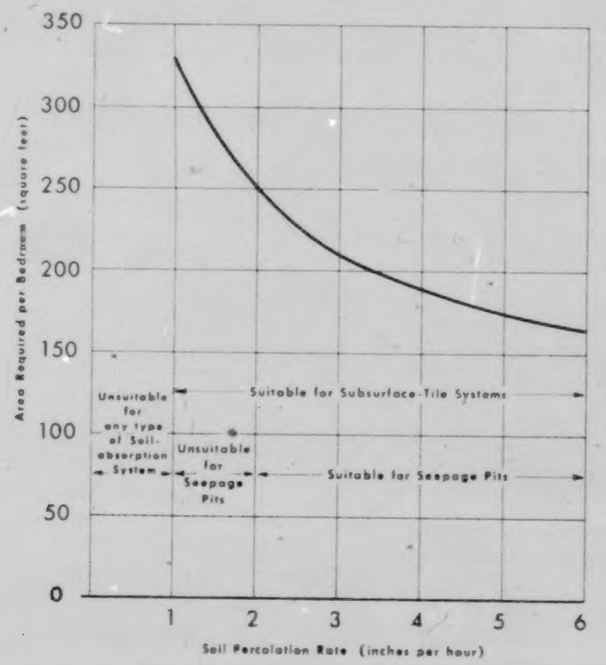
2. Pour at least 12 inches of water in each hole. Add water as needed to keep water level 12 inches above gravel for at least 4 hours or preferably overnight during dry periods. If percolation tests are made during a dry season, the soil must be thoroughly wetted to simulate its condition during the wettest season of the year.

3. After the wetting period, measure the drop in water level over a 30 minute period. In Connecticut the minimum rate is 1" per 30 minutes. The requirements will vary by state.

4. From the percolation rate, it is possible to calculate the size leaching field based on a chart similar to the one below.


SOLD
LOT - 7
MEASURING STICK
TEST HOLES - 6 OR MORE DEPENDING ON AREA
DO NOT MOVE DURING READINGS
MEASURE HERE IN INCHES PER HOUR
BOARD FOR FIXED POINT OF REFERENCE
KEEP STICK IN GUIDE LINES
4"
2"

A percolation test hole with measuring stick is shown in the foreground; other test holes properly distributed over the field are in the background.



Size of absorption field needed for private residences. Adapted from Manual of Septic Tank Practice (*1*, p. 9)

Source: Soils and Septic Tanks - Agriculture Information Bulletin 349 - Soil Conservation Service

Return to the narrative after studying this guide sheet. Turn the recorder on again.

Guide Sheet No. 12

KEY FOR PERCOLATION RATE CLASSES

Delineates areas of probable percolation rate which can be used to assess the capability of a soil to transmit effluent from on-site sewage systems. Shallow to bedrock soils and those soils designated as Inland Wetlands by Public Act 155 as amended (the poorly and very poorly drained) are not included in this key.

In addition other soils can only be placed in a range of classes and these are listed, with the range of variability, at the end of this table.

The percolation rate classes are based on the probability of a one inch fall of the water level in a test hole within a specified time.

FAST percolation class - there is an 80% chance it will take the water level in a test hole less than five minutes to fall one inch.

PROBABLY FAST percolation class - there is a 50% chance it will take the water level in a test hole between or less than 10-20 minutes to fall one inch.

PROBABLY SLOW percolation class - there is a 50% chance it will take the water level in a test hole between or longer than 20-30 minutes to fall one inch.

SLOW percolation class - there is than an 80% chance it will take the water level in a test hole longer than 30 minutes to fall one inch.

Percolation Class - PROBABLY FAST:

AcA
AcB
AdB
AfA
AfB
AfC
AlA
AlB
BiA
BtB
BtC
BtD
BvB
BvC1/
BvC2/
BvC3/
ByC

ByD
CaA
CaB
CaB2
CaC
CaC2
CaD
Cad2
CaE
ChA
ChB
ChC
ChD
CrA
CrB
CrC
CrcC

CrD
CsA
CsB
CsB2
CsC
CsC2
CsD
CsD2
CtB
CtC
CtD
CvC
CvD
CxA
CxB
CxC
CxD

Cx1B
Cx1C
Cx1D
CxmC
CxmD
DeA
DfA
DoA
DoB
DoC
DoD
DvB
DvC
NaA
NaB
NaB2
NaC

NaC2
NaD
NgB
NgC
NgD
NhC
NhE
NnA
NnB
Od
SvA1/
SvA2/
SvA3/
SvB1/
SvB2/
SvB3/
SvC

SwA1/
SwA2/
SwA3/
SwB1/
SwB2
SwB3/
SwC
SxA
SxB
SxbC
SxC1/
SxC3/
WeA
WeB
WfA
WfB
WfxA

WfxC
WgA1/
WgA2/
WgA3/
WgB1/
WgB2/
WgB3/
WgxA
WgxB
WgzB
WhA
WhB
WjA
WjB
WjxA
WjxB
WjzB

Percolation Class FAST:

AbA
AbB
AbC
Bax
BoA
BoB
BobB
BoC
BocC
CjB
CjC
CjD
CjxB
CjxC
CjxD
CkC
CkD

CwA
CwB
CwC
DfA
EfA
EhA
EhB
EkA
EsA
EsA2
EsB
EsB2
EsC
EsC2
EtA2/
EtA3/
EtaA

EtB2/
EtB3/
EtbB
EtC
EwA
GaA
GaB
GaC
GaD
GbA
GbB
GbC
GbD
GbmC
GbmD
GcA
GcB

GcG
GcC
GcD
GrA
GrC
GsB
GsC
GsD
GvC
GvD
HdA
HdB
HdC
HeA
HeB
HfA
HfB

HfC
HgC
HkA
HkB
HkC
HmA
HmC
HnA
HnC
JaC
JbC
McA
McC
MeD
MgA
MgB
MgC

MgrC
MhA
MhC
MrA
MrB
MrC
MsA
MyA
MyB
MyC
NrA
NrB
PnA
PnB
PnC
SgA
SgB

SsA
SsB
SsC
Tg1/
Tg2/
Tg3/
TsA
TsB
TsC
TwA
TwB
WuA
WuB
WuC
WvA
WvaA
WvB1/

WvB2/
WvB3/
WvbB
WvC1/
WvC2/
WvC3/
WvcC

Percolation Class - SLOW:

BcA
BcB
BeC
BhA1/
BhA2/
BhB1/
BhB2/
BrA
BrB
BrB2
BrC
BrC2
BrD
BsA
BsB
BsC
BsD
BsxC

BxA
BxB
BxC
EmA
EnA
EnB
EoA
EoB
LoA
LoB
LoC
LpA
LpB
LpC
LsA
LsB
LtB
LtC

LuA
LuB
LuC
LumC
LwC
MmA
MmB
MnA
MnB
PaB
PaC
PaD
PbA
PbB1/
PbB2/
PbB3/
PbB2
PbC1/

PbC2/
PbC3/
PbC2
PbD
PbD21/
PbD23/
PbE
PbE2
PcB
PcC
PcD
PdA
PdB1/
PdB2/
PdB3/
PdC1/
PdC2/
PdC3/

PdD1/
PdD2/
PdD3/
PeA
PeB
PeC1/
PeC2/
PeC3/
PecC
PeD1/
PeD2/
PeD3/
PfC
PfD
Pg
PhA
PhB
PhC

PhmC
PhxA
PhxB
PhxC
PpB
PpbC
PpC
PuA
PuB
PuC
RaA
RaB
RaC
RbA
RbB
RbmC
Tc
Te

WkA
WkB
WkB2
WkC
WkC2
WkD
WkD3
WmA
WmB
WmC
WmD
WnC
WnD
WxA1/
WxA2/
WxA3/
WxB1/
WxB2/

WxB3/
WxC
WyA1/
WyA2/
WyA3/
WyB1/
WyB2/
WyB3/
WyC
WzA1/
WzA2/
WzA3/
WzaB
WzB
WzbC
WzC
WzrA
WzrC

Percolation Class - PROBABLY SLOW:

AgA
AgB
AgC
AkA
AnA

AnB
AnC
AoB
AoC
ApB

ApC
BaA
BaB
BbA
BbB

BqB
BqC
BuB
BuC
BwC

BwD
CyB
CyC
HbA
HbB

HbC
HcA
HcB
HcC
NsA

NsB
SnA
SnB
SnB2
SnC

SnC2
SnD
SnD2
SpB
SpC

SpD
SrC
SrD

Percolation Class-FAST TO PROBABLY FAST: GeC2/, GeC3/, EeE2/, GeE3/

Percolation Class-FAST TO FAST: NoC

Percolation Class-FAST TO PROBABLY SLOW:
BanB

Percolation Class-PROBABLY FAST TO SLOW:
NkC, NmC

Percolation Class-PROBABLY SLOW TO FAST:
BjA, BjB, BjtA, BjxC

1/ Indicates Hartford County only.

2/ Indicates Tolland County only.

3/ Indicates all counties except Hartford and Tolland.

GUIDE SHEET #13

CONTROLLING EROSION ON CONSTRUCTION SITES

"Erosion and sedimentation can be controlled effectively, and at reasonable cost, if certain principles are followed in the use and treatment of land. These principles are: (1) using soils that are suited for development, (2) leaving the soil bare for the shortest time possible, (3) reducing the velocity and controlling the flow of runoff, (4) detaining runoff on the site to trap sediment, and (5) releasing runoff safely to downstream areas.

In applying these principles various combinations of the following practices have proved effective:

1. Selecting land where drainage patterns, topography, and soils are favorable for the intended use.

2. Fitting the development to the site and providing for erosion control in the site development plan.

3. Using for open space and recreation those areas not well suited for urban development.

4. Developing large tracts in small workable units on which construction can be completed rapidly so that large areas are not left bare and exposed for long periods.

5. Grading at a minimum and removing only undesirable trees wherever possible.

6. Controlling runoff and conveying it to storm sewers or other outlets so it will not erode the land or cause offsite damage.

7. Protecting critical areas during construction with mulch or temporary cover crops and with mechanical measures such as diversions and prepared outlets.

8. Constructing sediment basins to detain runoff and trap sediment during construction.

9. Providing for safe offsite disposal of runoff, including the increased runoff resulting from construction.

10. Establishing permanent vegetation and installing erosion control structures as soon as possible."

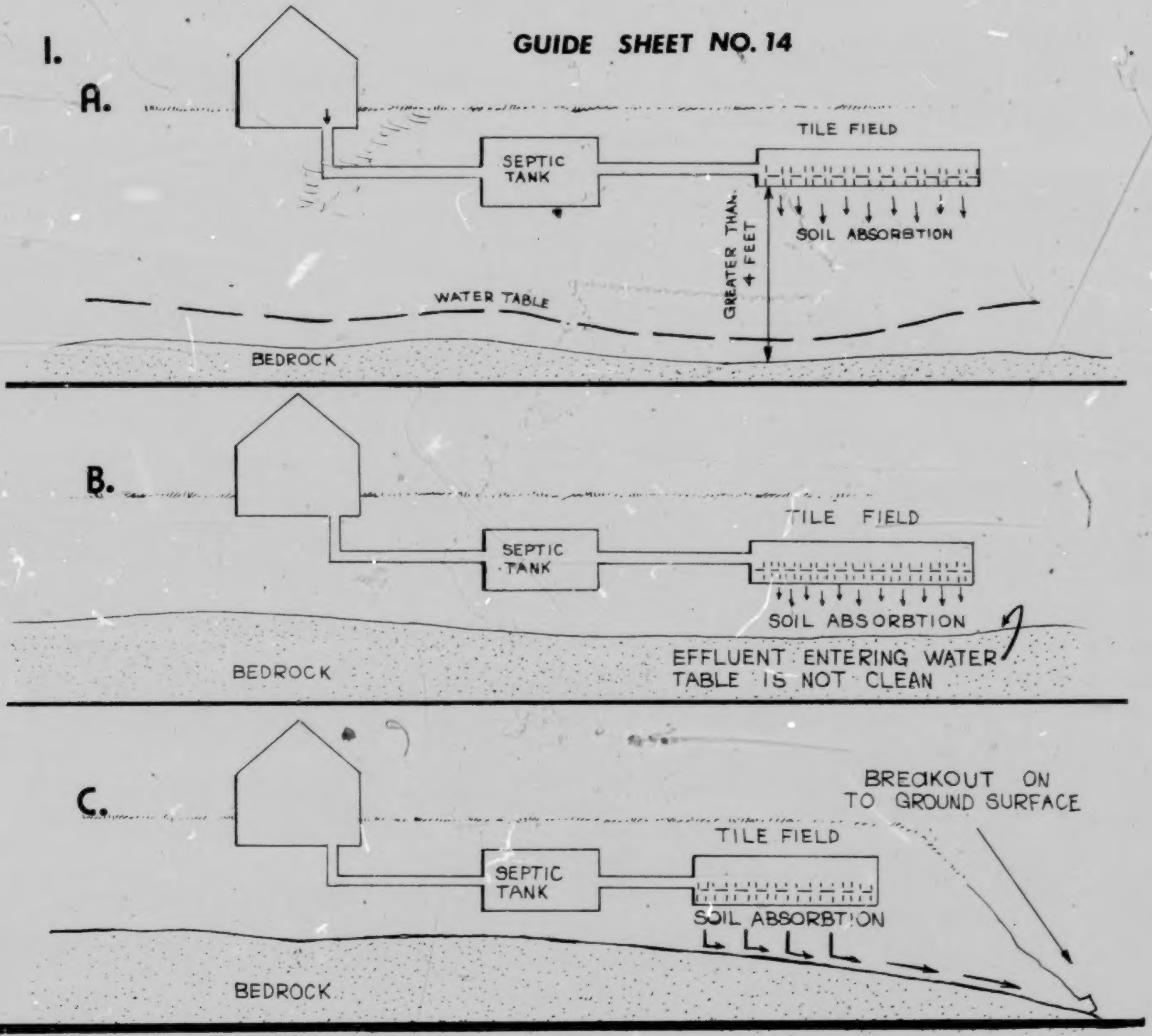
Source: Controlling Erosion on Construction Sites. USDA Soil Conservation Service. Agricultural Information Bulletin 347. p. 9 and 10.

ANSWERS TO GUIDE SHEET #10

SYMBOL	EXPLANATION
a. MyC	Merrimac sandy loam - 8 to 15% slope
b. PbD2	Paxton fine sandy loam - 15 to 25% slope, eroded
c. DoD	Dover fine sandy loam, 15 to 25% slope
d. HzE	Holyoke extremely rocky silt loam - 25 to 35% slope
e. WzA	Woodbridge very stony fine sandy loam - 0 to 3% slope

I.

GUIDE SHEET NO. 14


A.
TILE FIELD
SEPTIC TANK
GREATER THAN 4 FEET
SOIL ABSORBTION
WATER TABLE
BEDROCK
B.
TILE FIELD
SEPTIC TANK
SOIL ABSORBTION
BEDROCK
EFFLUENT ENTERING WATER TABLE IS NOT CLEAN
C.
BREAKOUT ON TO GROUND SURFACE
TILE FIELD
SEPTIC TANK
SOIL ABSORBTION
BEDROCK

II. KEY FOR DEPTH TO BEDROCK: 0-2 FEET

Delineates areas of barren rock outcrops and soils underlain by hard rock less than 2 feet below the land surface. Areas covered by shallow soils may have numerous rock outcrops (not precisely located as in a surficial geology map).

BkC
BnC
BnD
BohC
BpC
BpD
ClB
FaC
FaE
FbC
FbE
FmC
FmE
HhxA
HhxC
HjxD

HjC
HlC
HlE
HoC1/
HoC2/
HoC3/
HoE
HoD
HpA
HpC
HpE
HqD
HrC
HrE
HsC
HsE

HtC
HtD
HuC
HuD
HvC
HvE
HxC
HxE
HyC
HyE
HzC
HzE1/
HzE3/
NlC
Rh
RhC1/

RhC3/
RhE1/
RhE3/
Rk
RkC
RkE
ScC
ScE
SkC
SkE
SlC
SlE
SmC
SmE
SuC
SuE

1/ Indicates Hartford County only.

2/ Indicates Tolland County only.

3/ Indicates all counties except Hartford and Tolland

GUIDE SHEET #15

KEY FOR AGRICULTURAL LAND USE CAPABILITY (I AND II)

Delineates the first two capability units of soils. Soils are grouped on their suitability for most kinds of farming. The grouping is based on limitations of the soils (i.e., drainage, erosion, stoniness and wetness), the risk of damage when they are used, and how they respond to such treatments as drainage, irrigation and fertilization. There are eight capability units designated by Roman numerals I through VIII. In class I are soils with the fewest limitations, the widest range of potential use, and the least risk of damage. The soils in other classes have progressively greater limitations.

Capability units are primarily used to evaluate and plan methods of farm management, yet they provide the planner with an evaluation of the land for agriculture against use for sanitary landfills, home sites, open space and recreation.

The class I and II soils listed below are the best suited for agricultural purposes as well as many other land uses. With the increasing trend away from farming in Connecticut, these areas are the first to be turned into new housing developments, shopping centers and industrial parks, resulting in a permanent loss of agricultural capability. If we are to maintain a well-balanced land use program, a proper proportion of these lands should be set aside to meet the agricultural needs and desires of Connecticut's citizens in the future.

Class I. Soils that have few limitations that restrict their use.

Class II. Soils that have some limitations that reduce the choice of plants or require moderate conservation practices. Subclass designations, e, w, or s, added to the class numeral indicate the following:

e - the main limitation is the risk of erosion unless close-growing plant cover is maintained

w - water in or on the soil will interfere with plant growth or cultivation unless artificially drained;

s - soil limited mainly because it's shallow, droughty, or stony.

This list may not be complete and is subject to revision.

Soil	Class	Soil	Class	Soil	Class	Soil	Class
AbA	IIs-1	CaB	IIe-1	HdB	IIe-1	Po	IIw-5
AbB	IIs-2	CaB2	IIe-1	HeA	IIw-1	PoA	IIw-5
AcA	IIw-1	CsA	I-1	HeB	IIwe-1	PpB	IIs-2
AcB	IIwe-1	CsB	IIe-1	HfA	IIs-1	PuA	I-2
AfA	IIs-2	CsB2	IIe-1	HfB	IIs-2	PuB	IIe-2
AfB	IIs-2	CwA	I-1	LoA	IIw-2	RaA	IIw-2
AgA	I-1	CwB	IIe-1	LoB	IIwe-2	RaB	IIwe-2
AgB	IIe-1	DeA	IIs-1	MmA	IIs-2	SnA	I-2
AkA	I-1	DoA	I-1	MmB	IIs-2	SnB	IIe-2
AnA	IIw-2	DoB	IIe-1	MnA	I-1	SnB2	IIe-2
AnB	IIwe-2	Ee	IIw-5	MnB	IIe-1	SsA	IIw-1
BaA	IIw-1	EfA	IIw-1	MrA	I-1	SvA	IIw-1
BaB	IIwe-1	EnA	IIw-1	MrB	IIe-1	SvB	IIwe-1
BbA	IIw-3	EnB	IIwe-1	MsA	I-1	TsA	IIw-1
BbB	IIwe-3	EoA	IIw-1	MyA	IIs-1	TsB	IIwe-1
BcA	IIw-3	EoB	IIwe-1	MyB	IIs-2	TwA	IIw-1
BcB	IIwe-3	EsA	I-1	NaA	I-1	TwB	IIwe-1
BdA	IIw-4	EsA2	IIs-1	NaB	IIe-1	WeA	IIw-1
BeA	IIw-4	EsB	IIe-1	NaB2	IIe-1	WeB	IIwe-1
BhA	IIw-2	EsB2	IIs-2	NnA	IIw-1	WgA	IIw-1
BhB	IIwe-2	EtA	IIs-1	NnB	IIwe-1	WgB	IIwe-1
BoA	I-1	EtB	IIs-1	NrA	IIw-1	WkA	I-2
BoB	IIw-1	EwA	I-1	NrB	IIwe-1	WkB	IIe-2
BqB	IIe-1	GaB	IIs-2	NsA	IIw-1	WkB2	IIe-2
BrA	I-2	GcA	IIs-1	NsB	IIwe-1	Ww	IIw-5
BrB	IIe-2	GcB	IIs-2	On	IIw-4	WwA	IIw-5
BrB2	IIe-2	Gf	IIw-4	OnA	IIw-4	WxA	IIw-2
BtB	IIs-2	HaA	IIw-4	PaB	IIe-2	WxB	IIwe-2
BxA	IIw-3	HbA	I-1	PbA	I-2	WyA	IIw-2
BxB	IIwe-3	HbB	IIe-1	PbB	IIe-2	WyB	IIwe-2
CaA	I-1	HdA	I-1	PbB2	IIe-2		

In addition, class III soils have been used by the Governor's Task Force for the Preservation of Agricultural Land.

GUIDE SHEET # 16

A. DRAINAGE CATEGORIES OF SOILS FOR CONNECTICUT

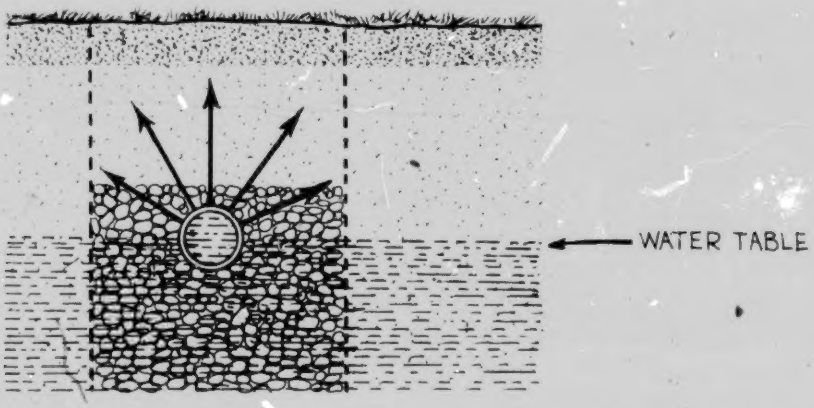
1. Excessively Drained and Well Drained - Water tables are rarely observed above 3 feet from the surface.

2. Moderately Well Drained Soils - During highest point of fluctuation - usually occurring in spring - the water table is 15 - 20 inches from the surface. Rarely persists beyond spring.

3. Poorly Drained Soils - Fluctuations are slower, during wet seasons the water table approaches 0 - 6 inches. It persists into summer and reappears after prolonged and heavy rains. It is 4 - 5 feet from the surface at its lowest point.

4. Very Poorly Drained Soils - Water remains on the surface for significant periods of time. The rest of the time it is always within 6 feet of the surface.

B. EFFECT OF HIGH WATER TABLE ON SEPTIC TANK EFFLUENT IN THE OBSORPTION FIELD



The high water table at tile level forces the effluent upward to the surface. This creates an unsanitary condition and health hazard.

KEY FOR MAP SHOWING SOILS SATURATED

WITH WATER WITHIN THREE FEET OF SURFACE LESS THAN 2 MONTHS OF YEAR

Delineates areas on the detailed soils map which have a temporary high water table within 3 feet of the land surface. In these areas, the water table may fluctuate over a wide range of depths. During the highest point of fluctuation, generally occurring in early spring, the zone of saturation may lie within 15 to 20 inches of the land surface. The high water table seldom persists beyond late spring. On-site septic systems placed within these areas may be subject to permature failure unless special design or site preparation is instituted.

AcA
AcB
AnA
AnB
AnC
AoB
AoC
ApB
ApC
BaA
BaB
BanB
BbA
BbB
BcA
BcB
BcC
BhA
BhB
BxA
BxB
BxC
Ee
EfA
EhA
EhB
EmA
EnA
EnB
EoA
EoB
HeA
HeB
LoA
LoB
LpA
LpB
LpC
LsB
LuA
LumC
LwC
LuB
NnA
NnB
NrA
NrB
NsA
NsB
Po
PoA
RaA
RaB
RaC
RbA
RbB
RbmC
Ro
RoA
SgA
SgB
SsA
SsB
SvA
SvB
SvC
SwA
SwB
SwC
SxA
SxB
SxC
SzA
TsA
TsB
TwA
TwB
WaA
WbA
WeA
WeB
WfA
WfB
WfxA
WfxC
WgA
WgB
WgxA
WgxB
WgzB
WhA
WhB
Ww
WwA
Wwk
WxA
WxB
WxC
WyA
WyB
WyC
WzA
WzaB
WzB
WzbC
WzC
WzrA
WzrC

GUIDE SHEET # 17

KEY FOR SOILS SATURATED WITH WATER WITHIN 3 FEET OF SURFACE FOR 2-12 MONTHS AND INLAND WETLANDS

Delineates all poorly drained (3a), very poorly drained (3b), and marsh and swampy (F1 and F2) soils which are saturated with water within 3 feet of the land's surface for 2-12 months of the year.

Public Act 155, as amended, includes in addition to the above mentioned soils all well (E1) and moderately well (E2) drained Flood Plain Soils within the Inland Wetland category.

(3a). Poorly-drained soils have a water table that remains within six inches of the soil surface during the wettest part of the year. The saturated zone persists into early summer and may reappear after prolonged or unusually heavy summer rains. The water table is usually observed within four to five feet of the surface even at its lowest point of fluctuation.

(3b). Very poorly-drained soils have water ponding on the surface for significant periods of the winter and early spring. The water table usually persists within three feet of the soil surface throughout the year.

(F1). Deep peats and muck soils occurring in depressional areas where surface organic deposits are usually 5 feet or more in thickness. They are saturated most of the time and water ponds on the surface in winter and spring.

(F2). Soils consisting of several inches to a few feet of boggy organic material overlying sandy or loamy mineral deposits. They occur in flat marshy areas adjacent to or near the coastline and are inundated during high tide. Areas near the coastline have a high content of soluble salt, but areas along larger streams more distant from the coast usually are not salty.

(E1 and E2). The well (E1) and moderately well (E2) drained flood plain soils occur on high and intermediate levels of stream flood plains. Because of their susceptibility to flooding, all of the flood plain soils have been legally included in the Inland Wetland category.

Am -(3a)
Au -(3a)
BdA -(E1)
BeA -(E1)
Bf -(3b)
BfA -(3b)
BgA -(3b)
Bm -(3a)
BmA -(3a)
Bmx -(3a)
Bz -(3b)
Ee -(E2)
Fr -(3a)
Fw -(F1)
Gf -(E1)
Gn -(3a)
Ha -(E1)
HaA -(E1)
Ka -(3a)
Kb -(3a)
Ke -(3b)
Lc -(3a)
LcA -(3a)
LcB -(3a)
LdA -(3b)
Le -(3a)
LeA -(3a)
Lg2/ -(3b)
Lg3/ -(3b)

Lm -(3a)
LmA -(3a)
Ln -(3a)
LrA -(3b)
LrB -(3b)
Lx -(3b)
Ly -(3b)
MoA -(3b)
MpA -(3b)
Od -(E1)
On2/ -(E1)
On3/ -(E1)
OnA -(E1)
PaW -(F2)
Pg -(F1)
Pk -(F1)
PkA -(F1)
Pm2/ -(3b)
Pm3/ -(3b)
PmA -(3b)
Pms -(3b)
Pn -(3b)
Po -(E2)
PoA -(E2)
Ps -(3b)
Rc -(3a)
Rcm -(3a)
Rcn -(3a)
Rd -(3a)

RdA -(3a)
Re -(3b)
Rg -(3a)
Rm -(3a)
Rn -(3b)
Ro -(E2)
RoA -(E2)
Ru -(3a)
RuA -(3a)
Sa -(3b)
SaA -(3b)
Sb -(3b)
SbA -(3b)
Sbx -(3b)
Sc -(3a)
ScA -(3a)
Sd -(3a)
SdA -(3a)
SeA -(3b)
Sf -(3b)
Shv -(3b)
Sj -(3b)
St -(E1)
StA1/ -(E1)
StA3/ -(E1)
SyA -(3a)
SzA -(3a)
Tm -(F2)
WaA -(3a)

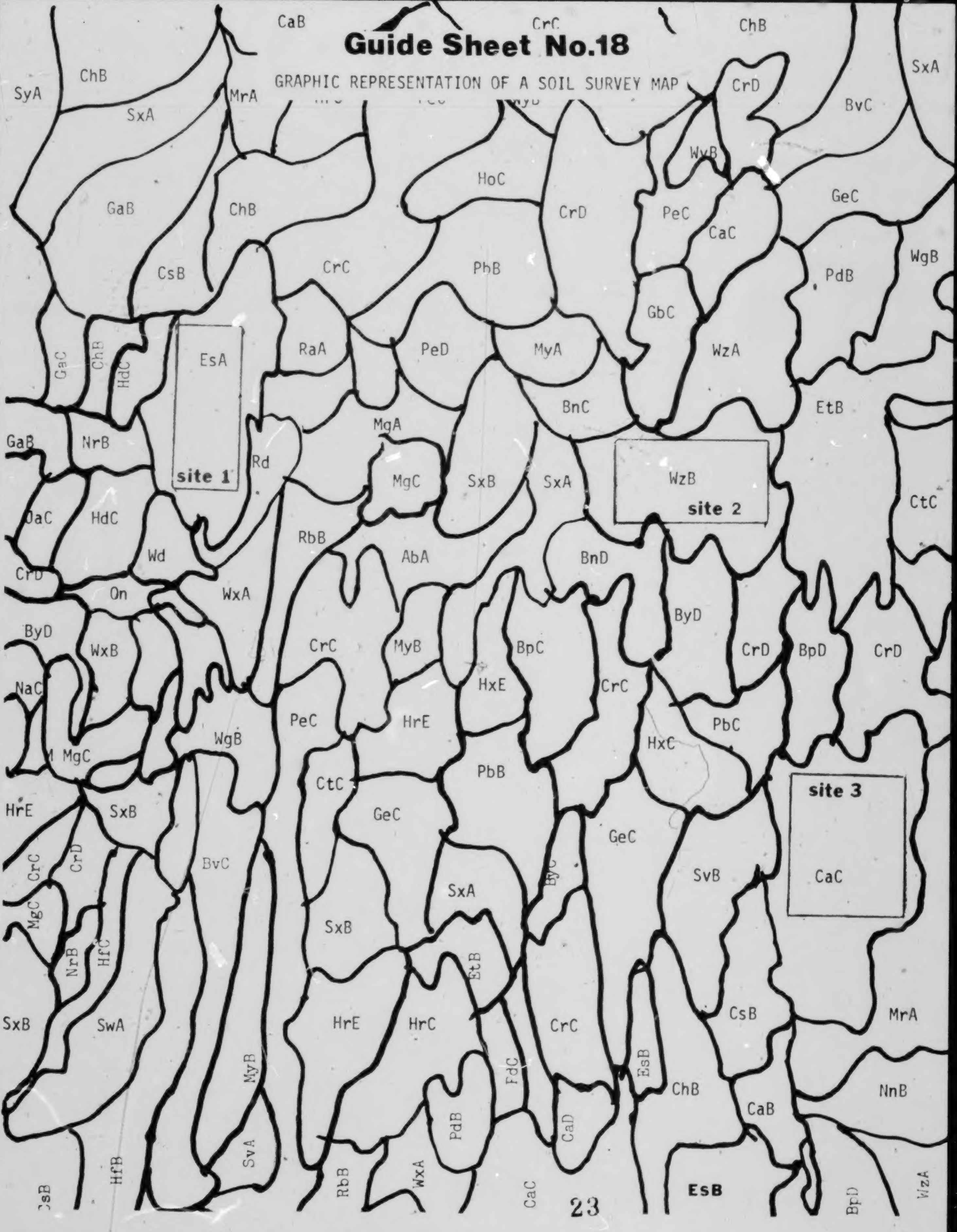
WbA -(3a)
WcA -(3a)
Wd -(3a)
WdA -(3a)
Wl -(3a)
Wmx -(3a)
WoA -(3b)
Wp -(3b)
WpA -(3b)
WpK -(3b)
Wpn -(3b)
Wps -(3b)
Wpz -(3b)
Wr -(3a)
WrA -(3a)
Ws -(3a)
WsA -(3a)
Wt -(3b)
WtA -(3b)
Ww -(E2)
WwA -(E2)
Wwk -(E2)
Www -(F2)
Wwx -(F2)

1/ Hartford County only
2/ Tolland County only
3/ Indicates all countries except Hartford and Tolland

NOTE -- This list subject to addition

Guide Sheet No.18

GRAPHIC REPRESENTATION OF A SOIL SURVEY MAP


CaB
CrC
ChB
SyA
ChB
MrA
CrD
SxA
SxA
BvC
WyB
HoC
GaB
ChB
CrD
PeC
GeC
CaC
CsB
CrC
PhB
PdB
WgB
GbC
GaC
ChB
HdC
EsA
RaA
PeD
MyA
WzA
BnC
EtB
GaB
NrB
MgA
Rd
site 1
MgC
SxB
SxA
WzB
site 2
CtC
DaC
HdC
RbB
CrD
Wd
AbA
BnD
On
WxA
ByD
ByD
WxB
CrC
MyB
BpC
CrD
BpD
CrD
NaC
HxE
CrC
PeC
HrE
PbC
M
MgC
WgB
HxC
CtC
PbB
site 3
HrE
SxB
GeC
GeC
CrC
CrD
BvC
SvB
ByC
CaC
MgC
SxA
SxB
NrB
HfC
EtB
SxB
SwA
HrE
HrC
CrC
CsB
MrA
MyB
EsB
FdC
ChB
NnB
CaB
PdB
CaD
SvA
HfB
CsB
RbB
WxA
CaC
EsB
BpD
WzA

GUIDE SHEET #19

SOIL SURVEY WORKSHEET

DATA SHEET

Site #1 Soil phase symbol EsA

Slope: 0-3%

Soil texture: silt loam

Rockiness: not rocky

Probable percolation rate: Fast

Depth to bedrock: greater than 2 ft.

Wetness (depth to water table): not within 3 ft. during year

Agricultural Land Classification: Class I-1

Options: The site based on the soils information appears to be an acceptable building lot. The only reservation is that it is prime agricultural land that possibly should be kept in production.

Site #2 Soil phase symbol ______

Soil phase:

Slope:

Soil texture:

Rockiness:

Percolation rate:

Depth to bedrock:

Wetness (depth to water table)

Agricultural Land Classification:

Options:

Site #3 Soil phase symbol ______

Soil phase:

Slope:

Soil texture:

Rockiness:

Percolation rate:

Depth to bedrock:

Wetness (depth to water table)

Agricultural Land Classification:

Options:

Turn the page over to find one possible analysis of site #2 and #3.

GUIDE SHEET #19 (continued)

A POSSIBLE ANALYSIS OF SITES #2 AND #3

Site #2

Soil phase symbol WzB

Soil phase: Woodbridge extremely stony fine sandy loam, 3 to 8% slope

Slope: 3 to 8%

Soil texture: fine sandy loam

Rockiness: extremely stony

Percolation rate: Fast

Depth to bedrock: greater than 2 ft. surface

Wetness (depth to water table): water with 3 ft. less than 2 months a year

Agricultural Land Classification: not class I or II

Options: Two conditions place severe limitations on the potential for housing development. The percolation rate is slow indicating on site sewage disposal is not possible. Unless sanitary sewers were available, the poor percolation rate would be limiting. Equally, limiting, to most development is water within 3 ft. of the surface several months a year. Surface stoniness is also a problem. Based on soils information, this site should not be used for development.

Site #3

Soil phase symbol CaC

Soil phase: Charlton fine sandy loam, 8 to 15 percent slope

Slope: 8 to 15%

Soil texture: fine sandy loam

Rockiness: not evident

Percolation rate: probably fast

Depth to bedrock: greater than 2 ft. from surface

Wetness (depth to water table): not within 3 ft. of surface

Agricultural Land Classification: not class I or II

Options: Slope will be a consideration in designing homes or placing septic tank leaching fields on the site. The steepness of the slope is not an absolute prohibition but it is a consideration. Proper design will be important. The percolation rate is acceptable otherwise, site seems suitable for development. There is no bedrock near surface; there is no water table within 3 ft.; and the site is not prime agricultural land. Site #3 is suitable for development with care based on the soils information.

Turn the recorder on when you are finished with your analysis.

Guide Sheet No. 20

BASIS OF INTERPRETATIONS FOR COMMUNITY AND URBAN DEVELOPMENT

SOIL PROPERTIES	COMPONENTS												
	Septic Tank Absorption Fields 1	Sanitary Landfill (Trench) 2	Sanitary Landfill (Area) 3	Dwellings with Basements 4	Dwellings without Basements 5	Small Commercial Buildings 6	Local Roads and Streets 7	Lawns and Landscaping 8	Camp Areas 9	Picnic Areas 10	Playgrounds 11	Paths and Trails 12	Golf Fairways 13
1. Wetness (Depth to watet table)	X	X	X	X	X	X	X	X	X	X	X	X	X
2. Permeability	X	X	X	-	-	-	-	-	X	-	X	-	-
3. Depth to bedrock	X	X	-	X	X	X	X	X	-	-	X	-	X
4. Slope	X	X	X	X	X	X	X	X	X	X	X	X	X
5. Coarse fragments (On surface)	-	-	-	-	-	-	-	X	X	X	X	X	X
6. Surface texture	-	-	-	-	-	-	-	X	X	X	X	X	X
7. Soil texture (Through profile)	-	X	-	X	X	X	X	-	-	-	-	-	-
8. Surface stoniness	X	X	-	X	X	X	X	X	X	X	X	X	X
9. Surface rockiness	X	X	-	X	X	X	X	X	X	X	X	X	X
10. Flooding	X	X	X	X	X	X	X	X	X	X	X	X	X

USDA-SCS, CT & RI
June 1974

Guide Sheet No. 21

INTERPRETATIONS FOR COMMUNITY AND URBAN DEVELOPMENT

Woodbridge extremely stony fine sandy loam, 3 to 8 percent slopes

SOIL PROPERTIES		Septic Tank Absorption Fields 1	Sanitary Landfill (Trench) 2	Sanitary Landfill (Area) 3	Dwellings with Basements 4	Dwellings without Basements 5	Small Commercial Buildings 6	Local Roads and Streets 7	Lawns and Landscaping 8	Camp Areas 9	Picnic Areas 10	Playgrounds 11	Paths and Trails 12	Golf Fairways 13
1. Wetness (Depth to water table)	1½-3'	Sv	Sv	Sv	Sv	Sv	Sv	Sv	Sl	M	Sl	M	Sl	Sl
2. Permeability	Sl	Sv	Sl	Sl	-	-	-	-	-	M	-	M	-	-
3. Depth to bedrock	5'+	Sl	Sl	-	Sl	Sl	Sl	Sl	Sl	-	-	Sl	-	Sl
4. Slope	3-8%	Sl	Sl	Sl	Sl	Sl	M	Sl	Sl	Sl	Sl	M	Sl	Sl
5. Coarse fragments (On surface)	0-20%	-	-	-	-	-	-	-	Sl	Sl	Sl	Sl	Sl	Sl
6. Surface texture	fsl	-	-	-	-	-	-	-	Sl	Sl	Sl	Sl	Sl	Sl
7. Soil texture (Through profile)	fsl,l	-	Sl	-	Sl	Sl	Sl	Sl	-	-	-	-	-	-
8. Surface stoniness	ext.stony	Sv	Sv	-	Sv	Sv	Sv	M	Sv	Sv	Sv	Sv	Sv	Sv
9. Surface rockiness	none	Sl	Sl	-	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
10. Flooding	no	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
RATING:		Sv	Sv	Sv	Sv	Sv	Sv	Sv	Sv	Sv	Sv	Sv	Sv	Sv

USDA-SCS, CT & RI
June 1974

GUIDE SHEET # 22

*SOIL INTERPRETATIONS FOR COMMUNITY AND URBAN DEVELOPMENT

Soil interpretations are useful in evaluating land resources for community and urban development uses. They enable the planner or user to select the soil areas best suited for the various use components and to predict the kinds of problems and degree of limitation likely to be encountered. Interpretations also help to determine the kind and amount of on-site studies needed; thereby permitting necessary soil investigations at minimum cost.

The user is cautioned that the hazards and degree of limitation are based on the representative soil in each mapping unit. At any given point, the actual conditions may differ from the information presented because of the inclusion of other soils which are impractical to show at the scale of mapping used. On-site investigations are suggested for specific sites or where the proposed soil use involves heavy loads, deep excavations, or high costs.

SOIL LIMITATIONS FOR COMMUNITY AND URBAN DEVELOPMENT

Soils are rated for each use in terms of degree of limitation - SLIGHT, MODERATE, or SEVERE. The degree of limitations indicates the severity of problems exprected to be encountered for a specific use. Major hazards are listed when the soil has a MODERATE or SEVERE rating.

SLIGHT Sl - A rating of slight indicates that the soil has relatively few limitations in terms of soil suitability for a particular use. It is considered desirable for the named use.

MODERATE M - A rating of moderate indicates that it is relatively more difficult and more costly to correct the natural limitations of the osil for specified uses than for soils rated as having a slight limitation.

SEVERE Sv - A rating of severe indicates that the specified use of the soil is seriously limited by hazards or restrictions that are very difficult and costly to overcome. A rating of severe does not necessarily imply that a soil cannot be used for the specified purpose.

The decision as to whether or not a soil will be used for s specific purpose, regardless of the hazards and degree of limitation, is beyond the scope of this information. At a price, almost any limitation can be overcome. The information will help in planning more detailed investigations to determine the in-place condition of the soil at the site.

USDA-Soil Conservation Service
CT & RI June 1974

---

*This key and the accompanying matrixes were developed by the Soil Conservation Service of Connecticut. They have generously permitted their use in this unit. The matrixes are still in the process of development and refinement.

Guide Sheet No. 23

INTERPRETATIONS FOR COMMUNITY AND URBAN DEVELOPMENT

Enfield silt loam, 0 to 3 percent slopes		COMPONENTS												
SOIL PROPERTIES		Septic Tank Absorption Fields 1	Sanitary Landfill (Trench) 2	Sanitary Landfill (Area) 3	Dwellings with Basements 4	Dwellings without Basements 5	Small Commercial Buildings 6	Local Roads and Streets 7	Lawns and Landscaping 8	Camp Areas 9	Picnic Areas 10	Playgrounds 11	Paths and Trails 12	Golf Fairways 13
1. Wetness (Depth to water table)	4'+	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
2. Permeability	Mod	Sl	Sv	Sv	-	-	-	-	-	Sl	-	Sl	-	-
3. Depth to bedrock	5'+	Sl	Sl	-	Sl	Sl	Sl	Sl	Sl	-	-	Sl	-	Sl
4. Slope	0-3%	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
5. Coarse fragments (On surface)	0-20%	-	-	-	-	-	-	-	Sl	Sl	Sl	Sl	Sl	Sl
6. Surface texture	sil	-	-	-	-	-	-	-	Sl	Sl	Sl	Sl	Sl	Sl
7. Soil texture (Through profile)	sil/grs	-	Sv	-	Sl	Sl	Sl	Sl	-	-	-	-	-	-
8. Surface stoniness	none	Sl	Sl	-	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
9. Surface rockiness	none	Sl	Sl	-	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
10. Flooding	no	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
RATING:		Sl	Sv	Sv	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl

USDA-SCS, CT & RI
June 1974

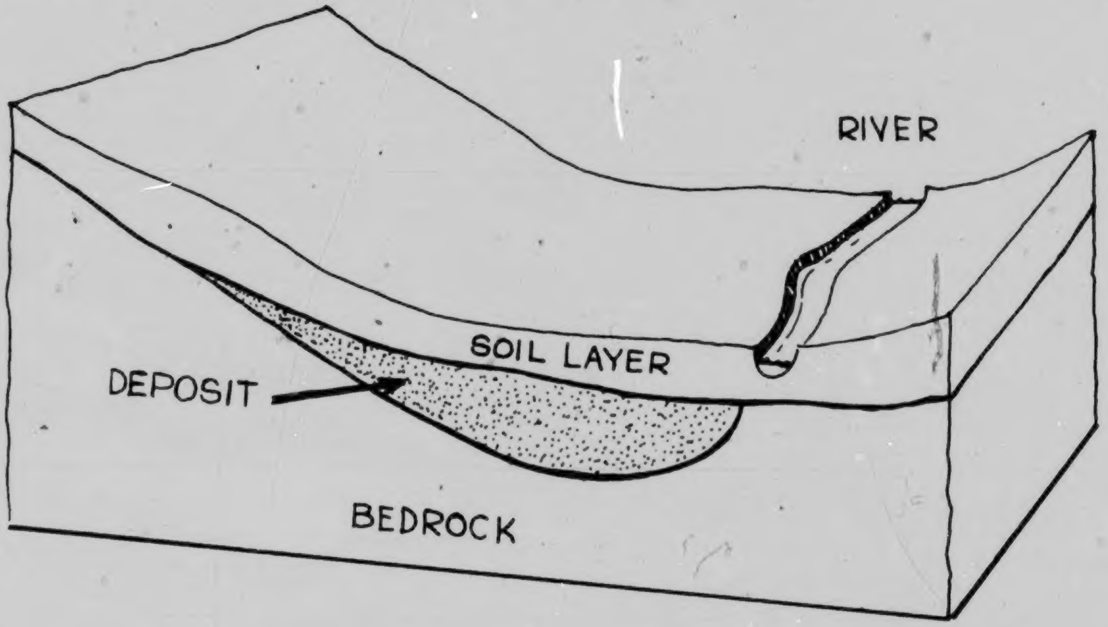
Guide Sheet No. 24

INTERPRETATIONS FOR COMMUNITY AND URBAN DEVELOPMENT

Charlton fine sandy loam, 8 to 15 percent slopes		COMPONENTS												
SOIL PROPERTIES		Septic Tank Absorption Fields 1	Sanitary Landfill (Trench) 2	Sanitary Landfill (Area) 3	Dwellings with Basements 4	Dwellings without Basements 5	Small Commercial Buildings 6	Local Roads and Streets 7	Lawns and Landscaping 8	Camp Areas 9	Picnic Areas 10	Playgrounds 11	Paths and Trails 12	Golf Fairways 13
1. Wetness (Depth to water table)	4'+	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
2. Permeability	Mod-MRp	Sl	Sv	Sv	-	-	-	-	-	Sl	-	Sl	-	-
3. Depth to bedrock	5'+	Sl	Sl	-	Sl	Sl	Sl	Sl	Sl	-	-	Sl	-	Sl
4. Slope	8-15%	M	Sl	M	M	M	Sv	M	M	M	M	Sv	Sl	M
5. Coatse fragments (On surface)	0-20%	-	-	-	-	-	-	-	Sl	Sl	Sl	Sl	Sl	Sl
6. Surface texture	fsl	-	-	-	-	-	-	-	Sl	Sl	Sl	Sl	Sl	Sl
7. Soil texture (Through profile)	fsl	-	Sl	-	Sl	Sl	Sl	Sl	-	-	-	-	-	-
8. Surface stoniness	none	Sl	Sl	-	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
9. Surface rockiness	none	Sl	Sl	-	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
10. Flooding	no	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl	Sl
RATING:		M	Sv	Sv	M	M	Sv	M	M	M	M	Sv	Sl	M

USDA-SCS, CT & RI
June 1974

Guide Sheet No. 25



YOUR ANALYSIS OF SITE #3.

1. What is the deposit under the site?

2. Possible limitations from the deposit itself:

3. Notations about slope of the site, and depth to bedrock:

4. Possible problems from slope or bedrock:

5. Is this site, in your opinion, a good one to develop? ______Why?

Refer to guide sheet #26 for our analysis of this site.

Guide Sheet No. 26

Our analysis of site #3.

1. What is the deposit under the site?

   The site is underlain by till.

2. Possible limitations from the deposit itself:

   There may be problems due to the low permeability of this deposit.

3. Notations about slope of the site, and depth to bedrock:

   The close contour lines designate a steep slope. There are symbols for bedrock outcrops nearby, thus bedrock is probably close to the surface here.

4. Possible problems from slope or bedrock:

   A steep slope means:

   extensive regrading
   erosion hazards
   septic system problems

   Shallow depth to bedrock means:

   excavation problems
   septic system problems

   Compact till, combined with possible shallow depth to bedrock and a steep slope cause the effluent to move downslope without adequate filtration. The effluent could surface downslope causing severe health hazards.

5. Is this site, in your opinion, a good one to develop?__________Why?

   In all, this site has real disadvantages. It could be developed, but the environmental and economic costs would be high.

Retrun to the narrative. Turn the tape recorder back on.

GUIDE SHEET NO. 27

GEOSYSTEM MATRIX*

Consideration	Rationale	Protection**	Regulation**	High Costs**
A. Depth to Bedrock	indicator of the thickness of soil or other material between the surface of the ground and underlying bedrock	most bedrock outcrops or bedrock close to surface will be ridgelines with scenic value.	Public health regulation require a minimum of 4ft of material (having an acceptable percolation rate) bottom of the leaching field trenches	In areas where Bedrock is close or near surface, blasting will be necessary for foundations, utilities, roads, etc. Fill may be needed for septic system and land scaping
B. High Water table levels	high water table will accept septic system function and or basement flooding. moderately well drained soils are where water table is present within 3 ft. of surface at least 1 or 2 months a year i.e. seasonal high water table soils with water table present within 3 ft. of surface most of the year are poorly and very poorly drained soils. i.e. permanent high water table	wetland areas are a valuable natural habitat and a storage area for flood waters and the slow discharge of water during times of low stream flow	Poorly and very poorly drained soils are regulated under Inland Wetlands Act. Most activities require permit. Public health code requires 18 in. of permeable material between the bottom of a leaching field trench and the maximum ground water level	permanent high water table require draining, dredging and fill for septic system to work properly. Areas with seasonally high water table may require certain drains to divert groundwater from basement and septic system.
Steep slopes	Areas with steep slopes have potential problems with foundations, septic systems, roads and erosion of surface materials.	serious potential for erosion	Public health code requires special design for septic systems on steep slopes	Increased cost will occur for foundation, septic systems, roads, and utilities
Compact glacial Till "hardpan"	These area's present development problems because of the changeability of the material over short distances and its relatively poor percolation rate.	--	Friable and compact till areas have been designated as "areas of special concern" for which stricter regulations for septic systems have been proposed.	Most till areas will require the largest leaching fields specified by the Public Health Code. In addition compact till areas may require special drains to prevent basement and septic system flooding.
Excessively Drained Soils	These are areas of sand and gravel where water moves through soil too rapidly.	These areas are best in terms of percolation test requirements, but have a potential for polluting groundwater. Detailed site analysis and extra data is needed before development approved	No present regulations (However, effluent is not properly treated unless it is in the soil for 24 hrs before reaching groundwater.	Possible time delays and more than usual testing and data gathering required to prove groundwater pollution will not occur.
Flood Plain Areas***	Area is subject to natural flooding. Structures in this area tend to increase flooding downstream.	Area is useful for agriculture, open space, recreation, and other uses not harmed by flooding. They serve as natural "safety valve" and protect other areas from being flooded.	Flood plains contain alluvial soils and other soil types regulated by streambelt zoning or floodplain regulation.	Dikes, dams, and filling would be needed to protect permanent structures here from flood waters.
Large Sand and gravel Deposits	Sand and gravel are important construction material whose extraction is not compatible with other forms of development.	Large deposits of sand and gravel should be kept from development until needed	--	--

Consideration	Rationale	Protection**	Regulation**	High Costs**
Agricultural Land	Preservation of Agricultural Land is essential to long term food production. Other rational in the Uplands unit.	Soils of Agricultural Land use capability classes I & II have the fewest limitations for agricultural use. (See Uplands Unit)	--	--
Natural Areas	identification of present and future open space areas	Serious consideration should be given to retaining important natural areas	--	--

* This matrix is based heavily on Natural Factors Affecting The Use of Land by Lawrence H. Johnson of the Connecticut Department of Community Affairs. Any errors in the preparation of the matrix are solely those of the editors of this unit.

** Protection - refers to an important resource which should be kept from development and possible contamination so that it may be used at some future date.

Regulation - refers to an area being affected by regulations or guidelines of a state agency.

High Costs - refers to physical conditions, such as bedrock, which increas a developer's engineering and construction costs.

*** A more accurate determination of areas subject to flooding can be made from a topographic quadrangle maps. These flood prone areas include areas which are 5 ft. or less in elevation above rivers, streams, marshes, and ponds.

SOURCES OF INFORMATION

Natural Resources Center - Conn. Dept. of Environmental Protection (DEP)

The center is the unit within the DEP with the responsibility for identifying the natural resource of the state, and providing that data to local decision makers. The Natural Resources Center is responsible for basic data collection and map production, including inventory of topography, geology, hydrology, soils, and biology, with the goal of registering all information on a common base for ease of information, integration and use.

Soil Conservation Service - SCS

The SCS is a goldmine of information. They have both state wide and regional offices, whose addresses are listed in the Introduction unit. The SCS is the source of all soil survey's as well as many informative materials for the layperson. We suggest you pay them a visit.

State Geological and Natural History Survey of Connecticut

Publishes the surficial and bedrock geology monographs and map. They are available from Publication Section, Connecticut State Library, Hartford.

WORDS WORTH KNOWING

ALLUVIUM. A general term for clay, silt, sand, and gravel deposited during comparatively recent geologic time by a stream or other body of running water as a sorted or semi-sorted sediment in the bed of a stream, floodplain, or delta; especially such a deposit of fine-grained texture (silt or clay) deposited during time of flood.

AQUIFER. A geologic formation, group of formation, or part of a formation that is water yielding, especially a body of rock or sediment that contains sufficient permeable material to conduct ground water and to yield economically significant quantitites of ground water to wells and springs, water-bearing formation.

BEDROCK. The solid rock, commonly called "ledge," that forms the earth's crust. In the report area, it is locally exposed at the surface but more commonly is buried beneath a few inches to as much as 200 feet of unconsolidated deposits.

CLAY. A loose, earthy, extremely fine-grained, natural sediment or soft rock, composed primarily of clay-size or colloidal particles and characterized by high plasticity and by containing a considerable amount of clay minerals (hydrous aluminum silicates); it forms a pasty, plastic, moldable, impermeable muddy mass when finely ground and mixed with water, retaining its shape upon drying, and becoming firm, rock-like, and permanently hard upon heating or firming.

COMPACT TILL. Glacial till with relatively high volume weight and low permeability rate. Till which was overridden by the glacier creating a very compact layer, particularly noticeable on the tops and sides of hills where overburden is relatively thin.

CRYSTALLINE ROCK. A general term that includes both igneous and metamorphic rocks; a term used for rocks composed of crystals or parts of crystals.

DEPTH TO ROCK. The distance between the land surface down through the unconsolidated overburden to the bedrock surface. A depth to bedrock map where available, is produced on a quadrangle basis and displays the location of all outcrops, the 0 to 10 foot depth to bedrock line, and every additional 50 foot depth line thereafter. Many surficial geology maps display outcrops and the 10 foot depth to bedrock line.

DROUGHTINESS. Property of soils with low water-holding capacity (excessively drained) that retain moisture to support plant growth for only short periods during the growing season, especially during hot spells.

EROSION. Movement of material from one place to another on the earth's surface. Agents of movement include water, ice, wind and gravity.

FLOOD. Any relatively high streamflow overtopping the natural or artificial banks in any reach of a stream.

FLOOD PLAN. The lowland that borders a river, usually dry but subject to flooding when the stream overflows its banks.

FLOODPLAIN SOILS. Occurs in nearly level flood plains in stream valleys. They are formed in loamy deposits several inches to a few feet thick overlying sand and gravel layers. These soils are subject to flooding with the lower lying, poorer drained soils being flooded most often.

FORMATION. Something naturally formed, commonly differing conspicuously from adjacent objects or material, or being noteworthy for some other reason. In geology bedrock formations are similar layers, groups, or series of beds which are distinctly different from adjacent groupings of rocks.

FRACTURE. A general term for any break in a rock whether or not it causes displacement due to mechanical failure by stress. Fracture includes cracks, joints, and faults.

FRAGIPAN. A dense natural subsurface layer of soil rich in silt, sand, or both, and generally low in clay, and whose hardness and relatively slow permeability are chiefly due to extreme density and/or compactness.

GNEISS. A foliated (thin layered) rock formed by regional metamorphism in which bands or granular minerals alternate with bands in which minerals having flaky or elongate, prismatic habits predominate. Generally less than 50% of the minerals show preferred parallel orientation. Although a gneiss is commonly feldspar and quartz-rich, the mineral composition is not an essential factor in its definition.

GRANITE. A light-colored, coarse-grained igneous rock formed deep within the earth. In Connecticut we are more apt to find granite gneiss rather than a true granite. Granite gneiss is a coarsely crystalline, banded metamorphic rock of granite composition.

GRAVEL. An unconsolidated natural accumulation of rounded rock fragments resulting from erosion, consisting predominantly of particles larger than sand (diameter greater than 2 mm, or 1/12 in.), such as boulders, cobbles, pebbles, granules, or any combination of these fragments; the unconsolidated equivalent of conglomerate.

GROUND WATER. Water beneath the land surface that is under atmospheric or greater pressure - the water that enters well and issues from springs. Water in the zone of saturation.

GROUND-WATER RECHARGE. The processes by which water is added to a ground - water reservoir.

HARDPAN. A general term for any hard layer in the soil zone which is impenetrable by roots.

HUMUS. Brokendown organic debris accomplished by decomposition and finally mineralization. As the humus is incorporated into the soil layers, new humus is constantly being formed as plant and animal debris accumulates. The equilibrium between the formation of new humus and the incorporation into the soil of the old humus determines the amount of humus in the soil.

ICE-CONTACT DEPOSIT. Stratified drift deposited in contact with melting glacier ice, such as an esker, kame, kame terrace, or a feature marked by numerous kettles. Stratified drift can consist of any size (gravel, sand, silt, or clay) unconsolidated materials.

IGNEOUS ROCKS. A rock or mineral that solidified from molten or partly molten material, i.e., from a magma; also, applied to processes leading to, related to, or resulting from the formation of such rocks. "Igneous" rocks constitute one of the three main classes into which all rocks are divided (i.e., igneous, metamorphic, sedimentary).

INFILTRATION. The flow of a fluid into a substance through pores or small openings. The common use of the word is to denote the flow of water into soil material.

LEACHING. The removal in solution of the more soluble minerals by percolating waters.

LEDGE. (a) A rocky outcrop or rock just below the land surface; rock solid enough to form a ledge. (b) a narrow, usually horizontal, shelf-like ridge or projection of rock, formed in a rock wall or on a cliff face.

LOAM. A rich, permeable soil composed of a friable (easily crumbled) mixture of relatively equal and moderate proportion of clay, silt, and sand particles, and usually containing organic matter, with a minor amount of gravelly material.

MAPPING UNIT (SOIL). Any soil, miscellaneous land type, soil complex or undifferentiated soil group shown on the detailed soil map and identified by a numerical or letter symbol.

METAMORPHIC ROCK. A rock which has been altered by heat or intense pressure, causing new minerals to be formed and new structure in the rock.

METASEDIMENTARY ROCK. A metamorphosed sedimentary rock

MODERATELY WELL DRAINED SOIL. All soils having a moderately high water table during wet seasons. During the period of high saturation, usually in early spring, the water table remains within 15 to 20 inches of the soil surface.

MOTTLING. Soil characteristic of irregularly marked spots or patches of different colors which usually indicate poor aeration or seasonal wetness.

OUTCROP. That part of a geologic formation or structure that appears at the surface of the earth; also, bedrock that is covered only by shallow surficial or soil deposits.

OUTWASH. (glac. geol.) Stratified detritus (chiefly sand and gravel) removed or "washed out" from a glacier by meltwater streams and deposited in front of or beyond the terminal moraine or the margin of an active glacier. The coarser material is deposited nearer to the ice.

PARENT MATERIAL. The rocks that originally formed the outer crust of the earth's surface are the raw material from which our soils are formed. This rock material known as parent rock becomes the parent material of soils as it disintegrates.

PERCOLATION. Movement under hydrostatic pressure of water through spaces of rock or soil.

PERCOLATION RATE CLASS. The S.C.S. has grouped most soils into four groups of probable percolation, the capability of the soil to transmit fluids. All shallow to bedrock soils and most inland wetland soils are not placed in a rate class. The four classes are Fast, Probably Fast, Probably Slow, and Slow, and each is based on the probability of one inch fall of the water level in a test hole within a specified time.

PERMEABILITY. The property or capacity of a porous rock sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure; a function of the amount of void space and more importantly their interconnection.

POORLY DRAINED SOIL. These soils as mapped by the S.C.S. have a water table that remains within six inches of the soil surface during the wettest part of the year. The saturated zone persists into early summer and may reappear after prolonged or unusually heavy summer rains. The water table is usually observed within four to five feet of the surface even at its lowest point of fluctuation.

POROSITY. The property of a rock or unconsolidated material of containing voids or open spaces; it may be expressed quantitatively as the ratio of the volume of its open spaces to its total volume.

RUNOFF. Water that flows off the land

SAND. A rock fragment or detrital particle smaller than a granule and larger than a coarse silt grain, having a diameter in the range of 1/16 to 2 mm (62-2000 microns, or 0.0025-0.08 in., or a size between that at the lower limit of visibility of an individual particle with the unaided eye and that of the head of a small wooden match), being somewhat rounded by abrasion in the course of transport.

SATURATED ZONE. The subsurface zone in which all open spaces are filled with water. The water table is the upper limit of this zone and the water in it is under pressure greater than atmospheric.

SCHIST. A strongly foliated crystalline rock formed by dynamic metamorphism which can be readily split into thin flakes or slabs due to the well developed parallelism of more than 50% of the minerals present, particularly those of lamellar or elongate prismatic habit, e.g., mica, hornblende.

SEASONAL HIGH WATER TABLE. The ground water table usually fluctuates with the season of the year. The seasonal high water table is the point of highest yearly fluctuation.

SEDIMENTARY ROCK. A rock resulting from the consolidation of loose sediment that has accumulated in layers, e.g., a clastic rock (such as conglomerate, eolianite, or tillite) consisting of mechanically formed fragments of older rock transported from its source and deposited in water or from air or ice, or a chemical rock (such as rock salt or gypsum) formed by precipitation from solution, or an organic rock (such as certain limestones) consisting of the remains or secretions of plants and animals.

SEPTAGE EFFLUENT. The liquid outflow from a home septic tank, which is a product of the digestion of household sewage.

SILT. A rock fragment or detrital particle smaller than a very fine sand grain and larger than coarse clay, having a diameter in the range of 1/256 to 1/16 mm (4-62 microns, or 0.00016-0.0025 in., the upper size limit is approximately the smallest size that can be distinguished with the unaided eye), being somewhat rounded by abrasion in the course of transport.

SOIL. The superficial material that forms at the earth's surface as a result of organic and inorganic processes. Soil varies with climate, plant and animal life, time, slope of the land, and parent material.

SOIL HORIZON. A layer of soil approximately parallel to the land surface with observable characteristics that have been produced through the operation of soil building processes.

SOIL PROFILE. The vertical cross sections from the surface down to the underlying unweathered material.

SOIL SERIES. Soils with similar profiles, similar in thickness, arrangement, texture and structure. It is named for a town or geographic area where the soil was first described and mapped.

SOIL SLOPE. Detailed soil maps show the ranges of slopes for each soil by including a capital letter at the end of the soil symbol (0-3% slope=A, 3-8% slope=B, 8-15% slope=C, greater than 15%=D, E, and F).

SOIL TYPE. A subdivision of the soil series based on the texture of the first horizon.

SOIL PHASE. A subdivision of the soil type to indicate variation in a feature that affects the management of the soil. For example, surface stoniness or slope.

SOIL TEXTURE. Refers to the coarseness of the soil. It is determined by the proportions of individual soil grains or particles.

SOIL SURVEY. The basic information on soil compiled by the U.S. Soil Conservation Service (SCS) in cooperation with the Agricultural Experiment Stations of Connecticut. Delineated are properties of the soil itself and characteristics of the landscape on which the soil rests.

STRATIFIED DRIFT. Fluvioglacial drift consisting of sorted and layered material deposited by a meltwater stream or settled from suspension in a body of quiet water adjoining the glacier. Deposits of layered sands, gravels, silts, & clays.

SURFACE RUNOFF. The runoff that travels over the soil surface to the nearest surface stream; runoff of a drainage basin that has not passed beneath the surface since precipitation.

SURFICIAL GEOLOGY MAP. Is compiled by the U.S. Geological Survey, Geologic Division, in cooperation with the Connecticut Geologic and Natural History Survey. It shows the distribution of the different kinds of unconsolidated materials that cover the bedrock as a discontinuous mantle of variable thickness.

TERRACE. Flat topped and stepped landform found generally along valley sides. Composed of stratified materials deposited from glacial meltwaters off the margins of the ice mass.

TOPOGRAPHIC MAP. Is compiled by the U.S. Geological Survey. It is a graphic representation of a small portion of the earth's surface. The configuration of the surface is commonly shown with contour lines that contain points of equal elevation.

TILL. Unsorted and unstratified drift, generally unconsolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier, and consisting of a heterogeneous mixture of clay, sand, gravel, and boulders varying widely in size and shape.

TRANSPIRATION. The process by which water vapor escapes from a living plant and enters the atmosphere.

UNCONSOLIDATED. Loose, not firmly cemented or interlocked, for example, sand in contrast to sandstone.

UNSATURATED ZONE. The zone between the water table and the land surface in which the open spaces are not all filled (except temporarily) with water.

VERY POORLY DRAINED SOIL. These soils have water ponding on the surface for significant periods of the winter and early spring. The water table usually persists within three feet of the soil surface throughout the year.

WATER HOLDING CAPACITY. The amount of water the soil will hold against the force of gravity, determined by soil texture, organic content and the amount and distribution of soil pore sizes, measured in inches of water per inch of soil.

WATER TABLE. The upper surface of the saturated zone.

WEATHERING. The response of materials that were once in equilibrium within the earth's crust to new conditions at or near contact with water, air, or living matter.

WELL DRAINED SOIL. These soils are drained and fairly dry throughout the year, depending on the type of parent material and geomorphic location. The water table may come within a foot of the surface during wet periods.

BIBLIOGRAPHY

Brady, Nyle C. The Nature and Properties of Soils. Macmillan, New York. 1974.

A complete textbook on soils for reference only.

Hill, David E. and Hugo F. Thomas. Use of Natural Resource Data in Land and Water Planning. Bulletin #733 The Connecticut Agricultural Experiment Station, New Haven, Conn. 1972.

An excellent semi-technical introduction to the title topic. Includes discussion of the significance of various natural resource factors to land use and a description of the data sources available in Connecticut. A case study demonstrates the planning process involved. This is included in your land use decision making kit through the generosity of the Conn. Agricultural Experiment Station in New Haven, Conn.

Johnson, Lawrence H. Natural Factors Affecting the Use of Land: the Use of Soil and Geologic Survey Data in Reviewing Proposed Development. Connecticut Department of Community Affairs.

An excellent summary of how natural resource data can be selected and used in land use decision making. The summary was prepared for Planning and Zoning Commission of Willington, Conn so it tends to be very practical. The report includes a good description of the use of overlays.

_______. A Connecticut Soils Primer. Cooperative Extension Service, University of Conn., Storrs, Conn. 1966.

A basic layperson's introduction to soils. Contains some material not directly relevant to land use decisions for urban use and development. More agricultural in focus. Very helpful as part of an initial introduction.

_______. Controlling Erosion on Construction Sites. U.S. Dept. of Agriculture, Washington, D.C. 1970.

A layperson's introduction. Explains the consequences of erosion and means of combatting it.

_______. Erosion and Sediment Control Handbook for Connecticut. U.S. Dept. of Agriculture, Soil Conservation Service, Storrs, Conn.

A technical handbook for the design of sediment and erosion control measures and structures. Helpful for the community that plans to require control measures on construction projects. Also contains technique to project potential soil less from a construction site.

_______. Geologic and Hydrologic Maps for Land-Use Planning in the Connecticut Valley. Geological Survey Circular # 674, U.S. Geological Survey, Dept. of the Interior, Washington, D.C.

An explanation of the maps of natural resource data being developed by the USGS's Connecticut Valley Urban Area Project. Although their availability is still limited, these maps display geologic and hydrologic information in a form directly usable for land-use decisions and planning.

_______. Know Your Land - Natural Soil Groups for Connecticut. U.S. Dept. of Agriculture, Soil Conservation Service, Cooperative Extension Service, University of Connecticut. 1971.

A layperson's introduction to Connecticut's Natural soils Group Classification system, very helpful for land-use decision, urban and agricultural. Explains soil factors limiting or facilitating for various land uses, based particularly on parent material characteristics. Valuable background for use of soils maps as planning tools.

_______. Know the Soil You Build On. Agriculture Information Bulletin # 320, U.S. Dept. of Agriculture, Soil Conservation Service.

A layperson's introduction to soil factors affecting construction and development. Quite general and brief. Extensively illustrated.

_______. Soils and Septic Tanks. Agriculture Information Bulletin # 349, U.S. Dept of Agriculture, Soil Conservation Service.

Another introductory pamphlet. This one explains the operation of septic systems and soil factors affecting them. With the others listed, a valuable part of an introductory package.

Audio Tape Script

Welcome to the Land Use Decision Making Unit on Geosystems. This unit is designed to involve you in evaluating the role of geosystems in the land use decision making process.

Geosystems are considered to be the systems which include the soils and geology of an area. The cover to the guide sheets for this unit has a graphic illustration of a cross section of the geosystem. The terms in the right hand margin are labels for various components of the geosystem. Stop the recorder for a few minutes and study the illustration. (Pause)

In an effort to make you become actively involved in this unit, we are assigning you a role which we wish to have you play during the first phase of this learning experience. For purposes of this unit, you are a builder or developer. We are giving you a parcel of ground to develop. A sketch of the site may be found on guide sheet # 1. Take a few minutes to determine what G.S. # 1
you will build on this site. Then, make a list of buildability factors which you feel should be considered before you begin construction. Stop the recorder, while you carry out this activity. (Pause)

Welcome back! What did you decide to build? Did you envision your building project as drawing large numbers of people to it? Did you consider access to your building or buildings? Did you consider parking needs? Did you give any thought to what the land would look like during or after construction? Did you consider the availability of water on the site? Did you consider sewage disposal factors? The factors you consider will reflect both the needs of your construction project, and the nature of the land on which you build.

Of course, the more information we have on a given site, the better we can plan for development.

In the past, some buildings constructed were without much regard for the particular site that they were built upon. The statement has been too frequently made, that it makes little difference whether we build on one parcel of land or another. Land is land!

Right! (voice change) Wrong!!! Let's take a look at a couple of slides which illustrate some potential problems related to site selection. After we complete this short survey, we will return to study some of these topics in more detail.

In the first slide, you can see a small post holding up the structure of a house. No, this is slide # 1
not a new way to build houses; something went wrong here. The ground is subsiding, and the house must be supported in some way to keep it level and help prevent it from cracking along the walls and ceiling.

The problem here relates to the ability of the soil to bear the weight of the building. If the particles that make up the soil give way easily, slippage can occur and result in cracks in the walls and ceilings of your building. Such instability can be disasterous for your building or house. If the builders of this house knew ahead of time that they would be constructing a building on a soil with this characteristic, special engineering techniques could have been utilized to compensate for possible soil slippage. Or, they might have decided to build on another site if the cost of the engineering solution was too high.

Slide #2 shows a basement containing standing water. (Pause) The water in the basement is not the result of a recent rainfall. In this case, the water is seeping up from under the building. Something is wrong here. Nobody wants a wet basement and the builder didn't expect this to happen to his group of building lots. slide # 2

Any potential builder should determine the depth of the soil above the water table. The water table reflects the ground water level or the accumulation of water above a slowly permeable soil layer. Problems are created when foundations and basements are placed at or below the level of the water table

In some areas, the water table is very close to the surface of the land. To avoid basement flooding in these areas, special construction techniques may be needed. Builders frequently attempt to deal with this kind of situation by filling or draining the areas. Both processes add to the costs of construction.

On guide sheet # 2 there is a diagram which shows the relationship of groundwater to the water table. Turn off the recorder and take a few minutes to study the diagram on guide sheet # 2. G.S. #2

The third slide shows a condominium complex that has lost a large portion of its front yard. The topsoil is being washed away and the whole scene looks disasterous. Would you be attracted to this condominium? slide #3

Land differs from area to area. There are smooth, nearly level areas, steep rugged areas, and areas of gently sloping or rolling hills. In the development process areas that are not level generally require special construction considerations, special landscaping and grading. These factors add to the costs of construction.

If the land is sloping then you must also consider the effects that rain water and runoff will have on your site. As water moves over the land surface it may move fast enough to carry away some soil. This process is called soil erosion. Water moving downhill may collect temporarily at the bottom of the slope. If you intend to build at the bottom of a hill, you may find yourself in a ponded area after a good size rainfall. After the water is finally gone, you will be left with the sediment which eroded off the hillside.

The type of soil you build upon may or may not be stable when laid bare for a construction site. Look at slide # 4. (Pause) Some soils such as those in slide # 4 will erode very quickly if the vegetation is removed. Other soils will not support vegetation. Thus trying to stabilize a cut bank with vegetative cover is difficult. The cut bank is likely to erode. This means costly addition of topsoil to the sites. The soil that has been eroded must go somewhere, either onto someone else's lawn, or into nearby waterways causing the death of plant and animal life and loss of water quality. slide #4

There are still other soils and geology factors which we should consider when planning the use of a land parcel. Just as soil characteristics vary, so does soil thickness. Some areas have very shallow soil, others have deeper soil layers. When construction begins, the builder may quickly discover he is excavating hard rock. This is a costly discovery, for it means blasting the rock if construction is to continue. This rock, called bedrock, underlies all soil. Knowledge of the depth of the soil above bedrock before construction begins can avoid many construction difficulties.

Another, buildability consideration which closely involves geosystem, is the disposal of sanitary wastes. If your building or house is not going to be serviced by sewers, you will need an on-site septic system. If you are not familiar with what an on-site septic system is and how it works, stop the recorder and study guide sheet # 3. G.S. # 3

The soil characteristics and the geology of a site effect the functioning of an on-site septic system. If the land is not level, and you have planned to use a septic tank and leaching field you may find your leaching field does not work quite the way you intended. The leachate may be puddling on the surface instead of filtering down through the soil. Special consideration may be needed for the design and construction of a leaching field on steep areas.

Because of the size of the particles they are made of, some soils may allow water to move through them very freely. Such soils drain quickly. If water can move through the soil quickly, so can the effluent from an on-site septic disposal system. The type of soil you build on may affect how well the effluent is absorbed into the leaching field and how well it may be filtered through the soil. Assuming proper design and installations this means the soil characteristics are a major determinant of the success or failure of on-site septic systems.

Closely related to soil type, is degree of water saturation in the soil. A septic field will not function if the soil is saturated with water. The effluent will not be able to be absorbed down through the soil and this will not be properly filtered. With heavy seasonal rains, the water table often moves closer to the land surface. When this occurs; the effluent or leachate will be carried up through the soil and can come through to the surface. This is not only an unpleasant situation but it is also unhealthy. Such areas are not suitable for building upon unless considerable modification of the site is made.

We must also give the depth to bedrock consideration for similar reasons. Being an impermeable substance, bedrock does not allow the downward flow of water. Even if we were to find a depression of "pocket of soil" in bedrock in which to build a house, there may not be enough soil present for an on-site septic disposal system. Health codes stipulate that there must be at least 4 feet of vertical distance between the bottom of a septic field and the bedrock for filtration of the effluent. If such a site is not serviced by sewers and needs an on-site system - there will be real problems if the bedrock is close to the soil surface.

Finally, knowledge about the land will allow us to extract resources beneath the land surface. Slide # 5 shows a picture of sand and gravel mounds at a quarry. In Connecticut, we extract sand and gravel as well as trap rock for building and construction uses. They are valuable resources. Knowledge of the geology of an area, will help locate these valuable resources and will permit them to be removed before they become tied up underneath residential, commercial or industrial develop- slide #5 ments.

We have discussed but a few development considerations that must be made with regard to soil composition and geology. There are many more which shall be discussed in detail further along in this unit. We have also presented a minimum of examples on how land use may be affected by variations in land, that is, variations in its shape and variations in its composition. Let's proceed one by one to analyze in detail how these differences in the land affect the way in which we ultimately make use of the land. Let's find out how information about the land may be obtained and how this information can be utilized to our greatest advantage in land use decision making!

Guide sheet # 4 lists the objectives for the geosystem unit. They will give you an idea of the knowledge and skills you will obtain while you are working with the unit. Turn off the recorder while you read the objectives (Pause). G.S. #4

First return to our discussion of the shape of the land. By the shape of the land, we mean the elevations, depressions, and level areas. This is the land's topography. It is the surface character of the land.

In Connecticut, our land surface has undergone many changes because of a geologic event called glaciation. Approximately 15,000 years ago an ice mass called a glacier, covered and eventually moved across this area. The pressure exerted by the glacier, the force of abrasion from its movement and the force of the meltwaters all served to carve out and construct a great deal of Connecticut's landform as we see it today. Guide sheet #5 has a diagram of the land features of Connecticut. G.S. #5 As we proceed with our discussion, study the illustration and definitions on guide sheet # 5.

In the eastern and western areas of our state we have very resistant rock forms that stood up to a great deal of the glaciers power. These rock remains form the Connecticut highlands.

In other parts of Connecticut the glacier pushed down great loads of rock debris called till. As the glacier moved, it carved out its own deposits to form thin hills, parallel to the north-south movement of the glacier. These thin hills are called drumlins.

In other areas of Connecticut we find stepped but flat-topped land forms. These are usually found along valley sides and are called terraces. As the glacier melted, debris and sediments were carried down by water along the side of the glacier and built up the land on the valley side.

In southern Connecticut, we have broad level areas. These are outwash plains where the meltwaters of the glacier spread rock debris in broad sheets beyond the glacial ice.

There is one other topographic feature that we should discuss, the floodplain. Floodplains are not the result of glaciation, they are quite common not only in our state but in all areas that have sizeable waterways. The floodplain is the lowland that borders a river or stream. It is formed by nature as a drainage channel for flood flows resulting from heavy snowmelt or rainfall. The floodplain is usually dry but is subject to periodic flooding. Connecticut is laced with river systems, and each has its own floodplain. (Pause)

How can we put together the information about all the various land features? What is it that each exhibits even though they appear very different from one another? We need a common factor!

The common factor is Slope. Slope is a ratio that tells us how quickly a land area rises in relation to the distance it takes to reach a given elevation. This relationship is diagrammed on guide sheet # 6A. On guide sheet # 6 part B there are two diagrams to illustrate different slopes. Turn off the tape recorder and study guide sheet # 6 diagrams A & B before we go on. (Pause) G.S. #6 G.S. #6B

The slope of the land is a topographic characteristic. It affects land use in a variety of ways depending on its steepness. It directly affects the cost of construction and the degree of environmental impact that construction on a given site will have. If you should decide to construct a building, a road, or to install services, on a slope, you will need to make the site relatively level. Look at guide sheet # 6 part C as we describe this leveling process. (Pause) G.S. #6C

Material cut from the uphill slope is used to build up the downhill slope. The builder now has a level area for construction. However, there are two places that most likely will need retaining walls or vegetational cover. If the retaining walls are not properly planted, the uphill bank could erode into the backyard or the downhill bank could slip or erode and carry soil from the front yard down the hill.

If you have decided to build on a sloping land area what other factors should you consider? (Pause) Are you building in an area not yet developed? For example a nice high area out in the country as in slide # 6? The view must be great, the peace and quiet are a real pleasure. However you still need services, utilities and sewage disposal. There are no sewers out here, that means an on-site septic system. But a septic field requires a relatively level area. A special system design is needed for sloping areas. slide #6

On a downhill slope the effluent under the force of gravity spreads outward in many directions--all downslope. This means there is little control over the effluent. On many hillsides, underlying rock or dense soils do not provide adequate downward penetration of septic system effluent. The effluent may even break out onto the surface further downhill.

Look at guide sheet # 6 part D. Here you see a diagram of a septic tank sewage disposal system designed for a sloping land. The tile lines are laid on the contour of the land rather than straight out and slightly downward from the tank. G.S.#6D

In many of the landforms we discussed earlier, slope is not steep. Thus construction techniques and special designs can well overcome the limitations slope may cause. In Connecticut however, there are many areas with steep slopes. Some of these areas have bedrock layers that are very close to the surface. There may also be areas with outcroppings where the rock appears above the soil surface. The slide, in your viewer shows a home built in a rock outcrop area. In the foreground you can see the rock outcrops. Excavation costs are increased in such areas, there is little soil to adequately filter the septic system wastes and accessibility is very difficult.

What about areas of little to no slope? These are perhaps easy to build upon but again consideration must be given to other geosystem factors. For example, we discussed the level areas bordering a river, the floodplain. These areas are accessible, level, even very fertile for planting and landscaping. But the one thing that made this area so level and so fertile also makes it hazardous to build here- the RIVER. The floodplain is that area that takes on the extra waters from heavy rains or snowmelt. Construction along a floodplain, especially in the form of bridges and roadways provide obstructions during a flood. These only serve to raise the level of the flood waters above their natural height. Higher flood-waters means greater damage to nearby buildings. Building in floodplains is a gamble. Suitable land uses for the flood plain might be agriculture, open space, forestry, water related industry, marinas, or water using industry.

It is obvious that there are many geosystem factors to consider before and during construction, but how can we gather information about the land? How can we determine if a site has a steep slope, gentle slope or is nearly level? How do we know that a parcel of land is in a floodplain without actually visiting the site? One method is to use a topographic map.

Turn to guide sheet # 7, lift the tracing paper and expose the topographic map. This is a reproduction of a portion of the Wallingford Quadrangle topographic map. The actual map is used in the unit on maps and map reading. G.S. #7

A topographic map presents landforms in terms of their slope and contour. The lines on the maps that do not define roads are contour lines. Each line represents a particular elevation and follows the contour of land at that elevation. Each line is ten feet higher or lower than the adjacent line.

Heavy contour lines are used to indicate 50 foot intervals . . on your map, the lines at 200, 250 and 300 etc. are typical of the 50 foot interval lines.

The closer the lines are to each other, the steeper the slope. When the contour lines are close together, the land is rising or falling in elevation over a short distance. Conversely, the farther apart the contour lines are, the flatter the land area is.

On the topographic map, on guide sheet # 7 identify the areas with the steepest slope and the flattest area on the map. (Pause) Remember, with steep slopes, the contour lines are close together. On relatively level areas, the contour lines are far apart. There is more than one steep or flat area on guide sheet # 7. Take your time in locating the steepest and flattest areas. Turn off the tape recorder while you carry out this activity. (Pause)

Now that you have done your best, there is a tracing paper overlay on the previous page which can be laid over the map on guide sheet # 7. The steepest area and flattest area are marked on the overlay. (Pause) How did you make out? Turn off the recorder if you want more time to study the maps before going on to the next part of the unit.

After completing the previous exercise, you should obtain a copy of the topographic map for your town. Find your neighborhood and see how it is represented in contour and elevation on the map.

Let us move on and discuss the composition of the land. How does the composition of land vary and how may we obtain information about the composition of the land?

First, let's take a look at how soil is formed. The different minerals in a rock do not expand and contract alike. Therefore, when a rock surface is subjected to sudden changes in temperature, the rock tends to crack and flake. When water works its way into these cracks and freezes, it expands and breaks the rock apart. Coarse grained rocks will develop larger cracks and breakdown faster than fine grained rocks.

Once water has begun to break the rocks into smaller fragments, the water is able to come into contact with more surface area of the rock. It is then able to react chemically with the minerals present in the rock. The soluble compounds in the rock may be dissolved and transported down through the soil into the groundwater, or they may move down a short distance and form a distinct layer in the soil.

The presence of plant and animal life in the soil adds to the organic content of the soil. In addition, burrowing animals and plant roots loosen up the soil and create air spaces. When these organisms die and decompose, they replenish the soil with a wide range of compounds which form a nutrient pool for future plant growth.

Another factor at work in soil formation is slope. Slope affects the speed of water flow able to pass over the land surface. The steeper the slope, the faster the water runs and the less able it is to penetrate within the soil itself. Erosion may occur and the soil may be constantly swept away preventing some areas from ever developing a stable soil cover.

Obviously, time is a major factor in the process of soil formation. It is time which provides for enough physical and chemical reactions to occur to develop a distinct soil layer. It is time that allows for enough rain to fall to affect the water content of the soil and possibly erode the land. It is time which allows for the parent rock material to undergo all these changes and develop a soil layer which is mature.

As the many processes and changes take place, soil with a distinct appearance is formed. The soil is layered showing the differing areas where certain chemical reactions occured and where the end products of these reactions have been deposited. These distinct layers are called horizons. A vertical view of the soil exposing all the layers or horizons is called a "soil profile".

Take a look at slide # 7. In slide # 7 you see a soil profile. In this profile, two distinctive soil layers can be distinguished. The upper layer horizon A is several inches thick and is much darker in appearance than the lower level or horizon B. (Pause) Now look at guide sheet # 8. On guide sheet # 8, you see a graphic representation of an idealized soil profile with selected information about the soil horizons. Turn off the tape recorder and read guide sheet # 8. (Pause)

slide #17

G.S. #8

There are some generalizations that can be made about soil color and texture from the soil profile without going through a detailed analysis. On guide sheet # 9 there are generalizations about soil based upon its color and texture. Stop the recorder and read guide sheet # 9a. (Pause) Usually subsurface soil colors are lighter than surface soils. Mottling, or the "patchy-colored" effect of some soils is caused by alternating layers of soil with good and poor aeration. This usually happens when the amount of ground water rises with seasonal rains.

G.S. #9

You may also note that soils differ in texture. Texture refers to the coarseness or fineness of soil, and is determined by the size of the mineral grains that make up the soil. There are basically three categories of soil particles that determine the soil texture. These are listed on guide sheet # 9 part B. These three categories describe soils by their grain size. Stop the recorder while you study the categories outlined on guide sheet # 9B. (Pause) G.S. 9B

It is important to emphasize that soils are rarely pure silt, clay, or sand. Usually, a soil is a mixture of soils from the three basic categories. However, one soil type may predominate.

The mixing of soil types allows for great variety in the appearance and characteristics of soils. Soil scientists have done a great deal of work evaluating and categorizing soils utilizing information about soil variations. Soils that have profiles very similar in thickness and arrangement of the major horizons and other important characteristics are called a "soil series". Each soil series is named for a town or other geographic feature near the place where the soil was first observed and mapped.

For instance, soils have been named Charlton, Holyoke, Paxton, Ninigret, Woodbridge, etc. The soil is named after the town in which it is first located. After the first identification, every time the soil is found again, it maintains its original name regardless of the locale in which it occurs.

Soil scientists working for the Soil Conservation Service (SCS) make a soil survey to learn what kind of soils are in a given location. As the soil scientists walk over the area, they observe the steepness of the land, shape of the land, kinds of rocks and any other characteristics which will aid in their understanding of the soil and its relation to the environment. They dig holes to expose the soil profile. Then they classify and name the soil according to a standardized procedure.

Soils can differ in texture, slope and stoniness among other characteristics. On the basis of such differences, soil scientists further differentiate among the soils within a soil series. The classification of soils by textures slope, and stoniness produces categories called "soil phases". On the top of guide sheet # 10 you will find definitions and a table to help clarify the nomenclature. Lets use the Ninigret soil series as an example. Remember that the name Ninigret designates a soil series and is named after the town in which it was found. Once the texture and slope characteristics are added to the name it is called a soil phase. In our example, the soil series is Ninigret; Ninigret, fine sandy loam, with 0-3% slope is a soil phase and also the soil unit that is represented on a map. G.S. 10

On slide # 8, there is a sample soil survey map. The soil map is usually drawn on an aerial photograph on which woodlands, buildings, field borders, trees and other detail can be distinguished. These details aid the soil scientist in drawing accurate boundaries for the mapping units. As you probably have noticed already, there is not room in each mapping unit to write in a full soil phase name such as Ninigret, fine sandy loam, 0 to 3% slope. For mapping purposes, soil scientists have developed a set of abbreviations, the shorthand system for soil symbols is summarized in section C of guide sheet # 10. On published soil surveys, Ninigret fine sandy loam, 0 - 3% slope would be abbreviated NnA. The capital letter, N, represents the soil series. Together with the little n, Nn, slide 8 is the soil type. The capital A at the end of the symbol, represents a 0-3% slope.

The first capital letter in each symbol is the initial of the soil name. The second capital letter A, B, C, D, or E, if used shows the slope. The slope symbol represents the average slope in a soil phase. Some soil symbols which contain no slope letter are for nearly level soils or land types. A final number in the symbol shows that the soil is eroded. If no erosion is observed, no symbol is indicated.

Not all the soil maps for the state of Connecticut have been published. On working maps, soil scientists code soil series temporarily with numbers. The numbers are translated to letters when the soil survey is published. In the far right hand column, the number type code is represented. For our purposes in this unit, we will use the alphabetical symbol and published surveys.

Let us check your ability to decode the symbols on a soil surveys. On part D of guide sheet # 10 there is a sample soil symbol legend as well as a set of symbols for you to interpret. Turn off your recorder and do these exercises.

Now that you have had an elementary exposure to interpreting a soil survey, obtain a copy of your county's soil survey report and study the soil types and conditions of slope, rockiness and erosion in your community. If you get the soil survey report for your community, you will be able to see how a soil survey appears in its entirety. You will also be able to see the very specific types of information given in these surveys for special land uses such as agriculture. In many soil surveys, for example, soil scientists have even estimated the average per acre yield of principal crops such as silage corn or alfalfa hay for a given soil series.

You might also find it very interesting to look up the soil type you live upon. Check out its suitabilities and limitations just as we will be doing in the following exercises.

Now that you know soils may vary considerably depending upon factors at work during their formation, what does this information mean to you? What effect will this information have upon you as you make land use decisions?

The properties soil exhibits may greatly affect usage patterns for a particular site. Each land area has a set of characteristics which we can infer from the soil type. Different soil types will differ in the degree to which their properties effect land use. Knowledge of the properties of a particular soil type may mean success or failure in your planning of a land use. The properties we are referring to are: permeability, erodibility, bearing capacity and the depth to bedrock or an impermeable layer of soil known as hardpans.

Permeability is the ability of the soil to permit the movement of air and water through the soil layers. Permeability depends not only on the size of openings and pore spaces present in soil, but also on the amount of interconnection among the openings. On guide sheet # 11 there are two diagrams contrasting soils with different permeabilities. (Pause) In the first example, we see soil particles that are fairly uniform in size. This creates a great deal of space between the particles for air and water movement. The second soil type however, has small particles filling in the spaces between the larger particles. This condition restricts the movement of water and air through the soil. Permeability is an important factor in the planning of on-site septic tank

G.S. #11

sewage disposal systems. If the soil is not permeable, the septic system may back up or the effluent from the system may emerge at the soil surface as in slide # 9. In either case, a health hazard is created. If the soil is too permeable, the sewage effluent may move downward into the groundwater too rapidly to be adequately filtered and purified. This too may create a serious health problem. slide #9

To estimate the potential rate of movement of sewage effluent through soil and away from the absorption field, a percolation test is made.

Percolation tests give us a indication of the permeability of the soil. Percolation tests determine the suitability of a particular soil types for on-site sewage disposal. The standard percolation rate is 1" per 30 min for infiltration of water into the soil. This precludes the possibility of unsanitary surface conditions.

On part B of guide sheet # 11, there is a description of how a percolation test is made. Turn off the recorder and spend a few minutes familiarizing yourself with the percolation test and its relation to on-site septic systems. (Pause)

While it is important to perform a percolation test at every site as the guide sheet mentions, it is possible to obtain a first approximation of the percolation rate from the soil survey and a key of percolation rates. Turn to guide sheet # 12.

Scientists have divided soil phases into four classes of percolation rates: fast, probably fast, probably slow, and slow. To determine the percolation rate of a specific soil phase, scan the table to find which classification your soil phase is under. For instance, if a home site was located on a soil phase identified as GaB (pause) we would search the table to find which section GaB is located in. In this case GaB is found in the probably fast category. Look at the probably fast category and locate soil phase GaB. If a building site was on a LuA soil phase (pause) what would you expect its percolation rate to be? (5 sec pause) Correct, it would most probably have a slow percolation rate. G.S. #12

As we mentioned earlier, the key is only a rough guide. A percolation test must still be performed on the site! However, the key helps us in the first stage of planning. We will return later to the percolation key to help us make some land use decisions.

Permeability of the soil will also influence the amount of groundwater available. A detailed explanation of groundwater and its importance is given in the Hydrology Unit. Basically, the more permeable the soil the greater the supply of water available is the area.

Another property which we will consider is the erosion potential of different soils. When cleared of vegetation, for construction or other activities, soils which differ in texture will erode at different rates, even under similar conditions of rainfall, slope and length of slope. It is annoying and expensive for homeowners and contractors to have to buy topsoil to replace soil that has washed away from a building site.

The problem doesn't end with the construction site itself. Earlier in this unit we pointed out that eroding soil must go somewhere. Look at slide # 10. Houses in this development have lost topsoil through erosion. Look where the eroding soil is being deposited. The soil is going right into the roadway. This means costly town maintenance of the road to remove the sediment and irritation to the neighbors when their automobiles get scratched and dirtied. Now look at the next slide .

slide # 10. Since when is water brown? This waterway has been muddied from the construction sites in the background. No steps were taken to prevent erosion during construction. What kind of fish or wildlife, would you imagine could survive such conditions? It's not very pleasant is it? Think of this the next time you see a construction site with the soil exposed and the ground vegetation gone. If you check closely you will probably see gullies and rills, the signals of the ongoing process of erosion. slide 10

However, the problems of erosion on moderately steep slopes are not insurmountable. With careful planning, many slopes can be developed in an environmentally sound manner. Guide sheet # 13 outlines some principles and procedures suggested by the Soil Conservation Service to reduce erosion. The principles are effective on soils that are suited for developement. They include such practices as, leaving the soil bare for the shortest period of time, . . . reducing the velocity and controlling flow of run-off, . . . detaining runoff on the site to trap sediment, and releasing runoff safely to downstream areas. If you are interested or are confronted with erosion and sedimentation problems, we suggest you contact the Soil Conservation Service for advice or their excellent written materials. Stop the recorder, while you study guide sheet # 13. G.S. #13

Another soil characteristic of importance in land use planning is bearing capacity. Slide # 11 shows what can happen if you do not give proper attention to the soils. The bearing capacity of a soil is how much load per square foot the soil can withstand before it is deformed. This depends on the uniformity of the grain or particle size of the soil. Try to stack up marbles to form a mound. It won't work. Likewise, a soil made of uniform grains is not stable and is subject to slippage. Slippage is of special concern in soils with any significant amount of clay, or fine sand. Increase in moisture content will serve to decrease the stability of these soils. Bearing capacity estimates the plasticity of the soil. It can be considered to be an indicator of the ease of compaction of the soil. Engineers test bearing capacity by varying the moisture content of the soil sample and subjecting the soil to stress of known weights. They then determine any movement, tilting, or sinking that would indicate the soils instability. slide # 11

Unfortunately, on many construction sites, the soil suitability for bearing a heavy load is discovered only after construction has begun. If this property is tested far ahead of time it serves to minimize unnecessary construction and maintenance costs. Engineers are able to determine how wide a footing is needed to support the weight of a given structure in a specific soil phase. In some cases, the supports must go far down into the earth to gain the stability needed to support the building. Knowledge of the bearing capacity also helps to evaluate a soil for traffic flow and possible frost heaving of roads. Obviously, in slide # 12, the soil was not capable of bearing the heavy load of traffic on the roadway. In Connecticut, we are fortunate to have slide # 12 very few soils which have a low bearing capacity.

Another consideration in evaluating the soil for various land uses is the presence or absence of hardpan or fragipan. Both terms are used in Connecticut for a slowly permeable subsurface layer formed in compact glacial till. Downward movement of water is severely restricted in hardpan. Excess water from heavy rain, spring thaw or septic effluent are unable to filter through this soil layer. As a result, the water or sewage effluent will move laterally over the tope of the "pan". In slide # 12, we can see a cut bank with sewage effluent seeping out. The sewage effluent is the silver gray colored substance, seeping out of the bank several feet below the soil surface. Fragipan or hardpan may be more of a problem than a layer of bedrock since bedrock frequently has cracks through which water can move. Footing drains are generally necessary to prevent the seepage of water into basements in areas with fragipan or hardpan soil layers.

There are two other factors which are necessary for us to consider in land use decision making which relate not to the composition of the soil as much as to the depth of the soil. These are the depth of the soil over bedrock and the depth of soil above the water-table.

First we shall consider the importance of depth of the soil to bedrock. Bedrock lying close to the surface has its advantages and disadvantages. Some structures require the stability that bedrock provides. In fact many tall buildings have footings that are based on bedrock. If a soil does not have good bearing capacity, a builder may be forced to go down to bedrock for structural stability.

Architects often utilize ridges and rocky slopes for the dramatic effect bedrock outcrops create. In general, however, bedrock close to the surface creates problems. Excavation for basements and utilities may require blasting. On steeper slopes, cutting and filling for roads and building sites may encounter bedrock. This again hinders construction both in terms of time and cost.

Areas where bedrock is covered by a shadow soil layer can present problems for on-site septic tank disposal systems. Refer to guide sheet # 14. (Pause) Septic tank systems rely on filtration by soil to purify their effluent. This filtration process is shown in the diagram at the top of guide sheet # 14. Diagram B on the same page shows why sewage effluent would not be adequately filtered if the depth of soil above bedrock were insufficient. (Pause) In Connecticut, G.S #14
the public health code requires 4 feet of material having an acceptable percolation rate between the bottom of the leaching trenches and the bedrock ledge.

In diagram C we see a slanting bedrock surface. The effluent, inadequately filtered may flow downhill along the bedrock surface only to emerge at the ground surface where the bedrock outcrops. This is a condition similar to that in slide # 13, where the effluent was seeping out of the bank. slide 13
Another possibility is that the effluent will flow rapidly throug[illegible]acks or fissures in the bedrock. This could allow sewage effluent to infiltrate the groundwater resulting in pollution of the water supply.

Again, it is possible to obtain information about the depth to bedrock from the soil survey and an accompanying key for depth to bedrock. On Part II of guide sheet # 14, there is a key for soil phases which contain bedrock within 2 feet of the surface. If the soil is not listed the depth to bedrock will probably be greater than 2 feet. For example, soil phase RK (pause) has shallow bedrock, since it is listed in the key. But soil phase WuC (pause) is not on the key, so this phase probably has bedrock greater than 2 feet below the surface. G.S.#14

The depth of the soil above bedrock is directly related to crop productivity of both farms and forests. Deep soils are generally able to store more moisture and nutrients for plants than shallow soils. Soil scientists have classified different soils on the basis of their agricultural productivity. The key on guide sheet # 15 lists the soil phases that have been classified as the best suited for agricultural purposes. There are eight agricultural capability classes. Class I and II soils are best suited for agricultural purposes as well as many other land uses. The proposal to preserve some of Connecticut's prime agricultural land was based on the agricultural land use capability system. The Commission proposed that farms with class I, II or III soils be considered for preservation from development. If you are interested in this topic, the Uplands Unit considers the preservation of agricultural land in more detail. The important point at this moment is that land can be classified with regard to its agricultural capability based upon soil phase. G.S. #15

Another important soils consideration is the depth of the soil above the water table or zone of saturation of groundwater and or perched-water. Some areas have high water tables periodically during wet seasons, others have high water tables which persist throughout the year. Since the water table fluctuates seasonally due to rains and droughts, it is necessary to note their maximum height and their duration at depths which affect land use. Drainage categories are used in the classification of soils to describe the duration of the high water table during the year. Stop the tape recorder and look at guide sheet # 16 for an explanation of the drainage categories. G.S. #16
(Pause)

Drainage categories may be determined by observing plant life of the area, topography and direct observation of groundwater in test holes. Look at slide # 14. The presence of "mottling", that is, those alternating patches of orange and grey in soil, indirectly indicates the upper level of groundwater fluctuation. Mottling is caused by chemical reactions occurring when the pore spaces of the soil are filled part of the year with air and part of the year with water. In short, air and water cause the oxidation or rusting of the metallic components such as iron which are found in soil. slide 14

Soils with a high water table present severe building limitations. Basements can be flooded seasonally and septic tank absorption fields will not function. A look at the diagram in the center of guide sheet # 16 will help demonstrate how a high water table affects septic sewage effluent. The water table in this diagram is at the level of the tile field. The solid waste in these soils will become flooded with water during wet periods of the year producing an undesireable leachate. The high water table forces this leachate upward to the surface. This creates an unsanitary condition G.S. #16 and is a health hazard. The greater consequences of this occurrence is the possible affect to the ground and surface water quality of the area. Attention must be given to drainage systems or filling if development is to take place in areas with high water tables. If you wish to develop a wetland area, you must comply with the regulations set forth in P.A. 155 (1972), The Inlands Wetland and Water Courses Act. Most development in these areas can proceed only with a permit from the local Inland Wetlands Agency or State Department of Environmental Protection. Regulations cover deposition, filling or removing material, the diversion or obstruction of water flow, and the erection of structures. Basic information on this subject is presented in the Inland Wetlands A-T unit.

We now have a wealth of information about soils and water table, but how do we know whether we are building on a suitable soil or a wet soil without lengthy and costly on site analysis?

It is again possible to use a key and soil survey map to make a first determination of depth to water table.

Guidesheet # 16C lists soil phases which have a temporary high water table within 3 feet of the land surface during the rainy season. The high water table seldom persists beyond late spring. G.S. #16C

On Guidesheet # 17 is a key for soils saturated with water within 3 feet of the surface for between 2 and 12 months. The exact definitions of these soils are listed on the top of the guidesheet. (Pause) For example, soil phase Am is coded 3a which indicates a poorly drained soil. We will begin to use the keys to obtain information about sites in the next section. Before we go on, stop the recorder and study guidesheet # 16 and # 17. (Pause) G.S. #17

Now lets put all our information to use! On guidesheet # 18, there is a graphic representation of a soil survey map. We have deleted the aerial photograph background for this exercise, but retained the mapping units. Place the soil survey map on guidesheet # 18 in front of you. Locate site # 1. (Pause) We will assume that site # 1 is a building lot that we have the opportunity to evaluate. Lets assemble information about the site together. G.S. #18

The best starting point is to find the soil survey symbol on the map and to decipher it based on the soil symbol legend for names of soils on the Decoding Chart for symbols on guidesheet # 10. (Pause) For site # 1, the symbol EsA can be deciphered as follows: Es represents Enfield silt loam and A represents 0-3% slope. A form has been provided on guidesheet # 19, to summarize the information we are accumulating on this site. On guide sheet # 19 we can enter the slope as 0-3% and soil texture as silt loam. Since rockiness is not indicated in the symbol, we can assume the site is not rocky. The probable percolation rate can be determined from the key on guidesheet #12. (Pause). We find that the symbol EsA is listed under the fast percolation rate section. The information about our site is then recorded on guidesheet # 19. Site # 1 will probably have a fast percolation. G.S. #19 G.S. #12 G.S. #14

The depth to bedrock key is listed on guide sheet # 14. (Pause) The symbol EsA is not listed on the key on guide sheet # 14. This indicates that bedrock is at least 2 feet below the surface on the site. Wetness is determined by checking the keys on guidesheet # 16 and # 17. Both keys must be checked. (Pause) Soil phase EsA is not listed on either key leading to the conclusion that the watertable does not come within 3 feet of the soil surface during the year. Finally, let's check the Agricultural Land key on guidesheet # 15 (Pause) to determine if the soil is suitable for agriculture. EsA is listed as Class I which is prime agricultural land. After entering our data on Guidesheet # 19, we can begin to synthesize the information to determine our development options. The site, based on soils information appears to be an acceptable building lot. The percolation rate is acceptable for on-site septic systems, there are no bedrock problems and no problems with high water table. The only reservation is that it is prime agricultural land that possibly should be kept in food production. Even though we have made some tenative conclusions based on the data in the soil survey, we should not make a final decision until we have visited the site and completed on-site testing and evaluation to confirm our predictions.

G.S. #19

It is time for you to try your skills at site analysis. Complete an analysis of site # 2 and site # 3 located on guidesheet # 18. There is room to record your analysis on the lower half of guidesheet # 19 or you may use scrap paper. Turn off the recorder while you work. (Pause)

Welcome back. I am glad you did so well on your site analysis. Soil Scientists at the Connecticut office of the Soil Conservation Service have developed a matrix that will significantly aid us in our decision making. Guide sheet # 20 contains the master matrix.(Pause). They have listed the soil properties down the left hand column and various land uses across the top. An X is placed in each box where consideration of a soil property is important in deciding whether the land use is suitable based on the soil characteristics.

G.S. #20

For instance, if you were considering building a small commercial building, component No. 6 from the top of this chart, you would want information on wetness, depth of bedrock, slope, soil texture, surface stoniness, surface rockiness, and flooding. The rationale for considering each soil property is based on the discussions of each property in this unit.

The Soil Conservation Service has carried this analysis one step further. They have developed a similar matrix for each soil phase. Guidesheet # 21 is one example. Instead of simply placing an X in a box, they have rated each property in terms of degree of limitation for each use - SLIGHT, MODERATE or SEVERE. The degree of limitation indicates the severity of problems expected to be encountered for a specific use. Major hazards are listed when the soil has a Moderate or Severe rating. Also, they have provided a quantitative evaluation of each property, such as indicating on this matrix that the depth to bedrock was 5 feet plus. The explanation of the code is on guide sheet # 22.

G.S. #21

G.S. #22

Let us work through the analysis of one matrix together. The sample matrixes were selected because they match the exercise on guide sheet # 19. After we work through one matrix, you can go back to compare your analysis of your sites with the analysis of the Soil Conservation Service.

Let's begin with guide sheet # 21, the Woodbridge extremely stony fine sandy loam, 3 to 8

G.S #21

percent slopes. We will examine two land uses, no. 4. Dwellings with basements and no. 10 picnic areas.

Under dwellings with basements the matrix lists two severe limitations, surface wetness and surface stoniness. In providing a rating at the bottom of the matrix, the soil scientists concluded that there were severe limitations on using this site for a home with a basement.

In comparison, the use of the site as a picnic area had only one severe limitation, stoniness, and six slight limitations. Yet in their rating of this site as a picnic area, they suggest the site had severe limitations. The rating is *not* a weighted average. The most limiting property dominates the rating. For instance if all properties were rated slight limitations except one property that had a moderate limitation, the overall rating would be moderate limitation.

The matrixes provide valuable insights into the influence of the geosystem on land use decisions. The Soil Conservation Service is an excellent resource, we suggest you utilize them. Most importantly, obtain a copy of the soil survey for your town and the accompanying tables and explanatory material. Now, return to the matrixes on guide sheet # 21, # 23 and # 24 to compare your analysis of the three sites from guide sheet # 18 with the work of the Soil Conservation Service. It is especially important to understand how different soil properties influence different land uses. Turn the recorder off while you work with the matrixes. G.S. # 21,23,24

We have covered the most important aspects of soil formation, composition and properties. Now lets turn our attention to other aspects of the geosystem.

There are frequently deposits of geological material between the upper soil layer and bedrock. Guide Sheet #25 has a diagram which graphically illustrates the location of a deposit in a geological cross section. Geological deposits which occur in the few feet between the soil layer and bedrock are referred to as surficial geological deposits. These deposits of sediments or rock fragments have been carried to their present site by ancient glaciers, weathering, erosion or the activities of man. After the material was deposited, soil slowly formed to produce a covering soil layer. In many instances the presence of geological deposits will significantly influence the land use decision making process.

Information on surficial geological deposits can be obtained from a surficial geology map. Locate the surficial geology map of the Wallingford Quadrangle in your kit...open the map and stop the recorder while you make a brief study of the map format. When you have familiarized yourself with the general map layout, turn the recorder back on...(Pause)

You have probably noticed that the surficial geology map is a topographic quadrangle map with a new color code super-imposed. The surficial geology map has been designed this way so that contour lines will be present and the scale of the surficial geology will be the same as the topographic map. The contour lines, as we discussed earlier, help us determine slope on a site.

Before using any map, we should determine what year the map was produced. As you will note in the lower left hand corner, this surficial geology map is drawn on a topographic map prepared in 1954. For this reason many recent residential industrial and commercial developments are not shown on the map. Even Interstate 91 a major highway diagonally crossing the Wallingford Quadrangle is missing from the 1954 topographic map.

In any event, since the geological deposits have not changed, the map is suitable for our work in land use decision making.

The color key for the surficial geology map is in the upper right hand corner of the map. Turn the tape recorder off for a few minutes while you familiarize yourself with the color key, and the geological deposits which each color represents.

Let us begin our interpretation of the surfical geology map, with the top symbol in the key - artifical fill. Artifical fill is denoted by a dark brown color. It consists of deposits produced by man. These include highway and building fills and large accumulations of trash.

The Wilbur Cross Parkway is a prominent man-made feature that follows the Quinnipiac Valley from the center of the northern boundary of the Quadrangle to the southwest corner. The brown diagonal represents the artificiall fill necessary for the construction of the highway bed.

Stop the tape recorder and locate additional artifical fill areas. (Pause) What other evidences of man's activities do you find? Are the filled areas railroad rights of way, commercial or industrial developments or road beds? All of these uses have involved the use of fill in the Wallingford Quadrangle.

The predominant color on the surficial geology map is green. The key on the right indicates that the color green represents Till. Earlier, in the unit on guide sheet #5, we defined till as unstratified glacial drift deposited directly by the glaciers. Till consists of clay, sand, gravel and boulder intermingled in any propostion. Slide #15 (pause) shows a cut bank exposing the particles called till. Note that the till in slide #15 is composed of a mixture of particles ranging in size from clay to boulders.

Layers of till are usually several feet thick and in places may be compacted and quite dense. Till in the Wallingford Quadrangle like till in most of New England is quite stony.

As the glacier melted, its meltwaters carried rock fragments and soil that had been collected during the glacier's movement. The flowing meltwater sorted the debris by size. Close to the melting glacier, where the water flow was rapid, only the larger, heavier rock fragments were deposited. Further downstream where the flow was much slower, smaller and lighter, particles were deposited. These deposits are called ice-contact "stratified drift" because they have been deposited in layers. Each layer being relatively uniform in the particles sizes. On slide #16 there is an example of ice contact stratified drift. Notice the layer of gravel and then layers of sand. Not all stratified drift is as neatly sorted as this. By comparing slide 15 & 16 you can easily see the difference between glacial till and stratified drift. On the surficial geology map, "ice-contact stratified drift" is represented by the color pink. Stop the recorder while you locate deposits of stratified drift on this surficial geology map. Turn the recorder back on when you are ready to procede.

One other type of deposit of importance has been formed since glacial times. This material, called alluvium, has been deposited by flood waters or meandering rivers. Alluvium consists of thin layers of fine gravel, sand, silt and clay which covers valley floors and river floodplain. Alluvial deposits are indicated by bright yellow patches on the surficial geology map. If you look carefully, you will find that alluvial deposits occur on both sides of the meandering Quinnipiac River. Alluvial deposits are also found in the floodplains of several small streams in the Wallingford Quadrangle.

In the lower right hand corner of the map, you will notice several purple areas. (pause) The map key explains that purple areas represent bedrock. Dark purple indicates individual exposures of bedrock above the surface, while the lighter purple shading represents areas "with small or scattered exposures, or areas thinly covered with soil." As we have discussed earlier, bedrock on a site can mean additional expense excavating basements installing utility lines and can prohibit the use of on site septic systems. On the positive side, bedrock can provide a very suitable base for foundations.

The Surficial Geology map can also provide information on the economic geology of the region. Geologic materials such as gravel, sand or trap rock can be an important economic resource. We may wish to find out where they are located so we can excavate them and utilize them in construction and land grading. There is a great need for these materials in construction.

Trap rock is a common name for a rock form found over a large portion of Connecticut. This rock is very old and was formed when lava flowed out over the land surface through fissues. The rock breaks off in large blocks giving a steplike appearance. Trap is the shortened form of a german word trappen which means step. And so we use the term trap-rock.

Trap rock serves a multitude of purposes whether it is utilized in large block or smaller gravel-like pieces. In the beginning of this unit we listed many trap rock uses which include bases for roads, drainage areas and septic system drainage fields.

Gravel serves many of the same purposes as small pieces of trap rock. Gravel comes from a natural accumulation of rounded rock fragments in unconsolidated deposits. These fragments have a wide variety of sizes from good size rocks to pebbles or granules.

Sand is used mostly in the mixing of concrete and asphalt. Sand deposits have very small particles which are quite coarse and granular. They are not as fine as silt or clay.

Building over such deposits restricts and even eliminates the possibility of eventual use of these deposits as a resource. Well planned removal of these resources can leave the area suitable for alternative uses. The next slide, slide #17 shows a former gravel pit that is now being developed as a community recreation area. Such planning shows wise use of the land. Not only are the deposits under the soil layer utilized, but once the deposits are removed the land is available for future development.

Follow the brown ribbon representing the artifical fill for the Wilbur Cross Parkway from the top center of the map about 4 inches to the large irregular brown area. This area is artifical fill. According to the map key the upside down crossed shovels indicate that this is an operating sand and gravel pit. This area is a valuable economic resource to the region providing construction materials for community development.

Connecticut has a rich history of brick-making. Clay deposits have traditionally provided a source of material for brick production. At the southwestern end of the Wilbur Cross Parkway on the map, there are several blue areas with upright crossed shovels. This symbol indicates a clay pit. The area is colored blue because the clay pits fill with water. The pits become flooded because they are well below the soil surface and the water table. When a clay pit is in operation it is necessary to constantly pump out water and build dikes to keep out the river. The bar across the crossed shovels indicates that these clays pits are inoperative, but there are still active clay pits in the Quinnipiac Valley.

Deposits may also present some limitations for building just as the type of soil we build upon may or may not be suitable for a particular land use.

You may have noticed that there are three areas encircled and numbered on this map. We will analyze these three sites together using both the information given us from the surficial geology map about the deposit and information we have collected throughout this unit.

What is the deposit found on site #1? (Pause) The key shows the area is underlain by glacial till, a compact, nonsorted sediment. We mentioned earlier that till in places tends to be compact and therefore not very permeable. Low permeability could influence your on site septic disposal system's functioning. The filtration of the effluent will be slow but then again thorough.

There are no purple areas for bedrock outcrops on the site or nearby which indicates that bedrock is not close to the surface. From the topographic lines, we can see that the slope is moderate. Remember that steeply sloping areas generally have bedrock close to the surface and bedrock outcroppings are common. This site should then present few excavation problems.

The moderate slope means little difficulty in grading the site for access road construction or building sites. Unless the soil is easily eroded, a moderate slope such as this should not present serious erosion problem during construction. The moderate slope here could provide good drainage of water from the site. It may mean an attractive view for a housing development.

Let's take a look at site #2. What is the deposit underlying this site? (Pause) If we again look for the key, we find that the site is underlain by Ice-Contact Stratified Drift. We know that stratified drift is layered bacause of the forces at work during its deposition. Thus it is better sorted than till. Even though stratified drift may contain fine clays, it is more frequently composed mainly of sand and gravel. Thus the deposit is probably very permeable. If the effluent from an on site septic system is able to move very rapidly through the deposit, filtration may not be thorough.

A housing development in this area could put a strain on the filtering ability of the area if there are too many on site septic disposal systems. The groundwater could become polluted. The poorly treated effluent might reach the nearby river or streams causing a water pollution problem.

Properly constructed sewers to service the development would prevent a water contamination problem. This site lies between two ridges, therefore bedrock close to the surface should not present a great problem.

The slope is moderate and so the site looks like it has few problems which might affect constructions. Again, erosion should not be a problem here.

The patches of yellow along the stream to the west of this site designate what other deposit? (Pause) Correct, deposits of alluvium. This suggests that that portion of the area is subject to flooding. The topographic contour lines show that the majority of the site is 10-20 feet above the alluvium. However, in times of severe floods, it is not unusual for floodwaters to rise that high. The site seems to be a good one for development, but more data about the possibility of flooding in this area should be checked.

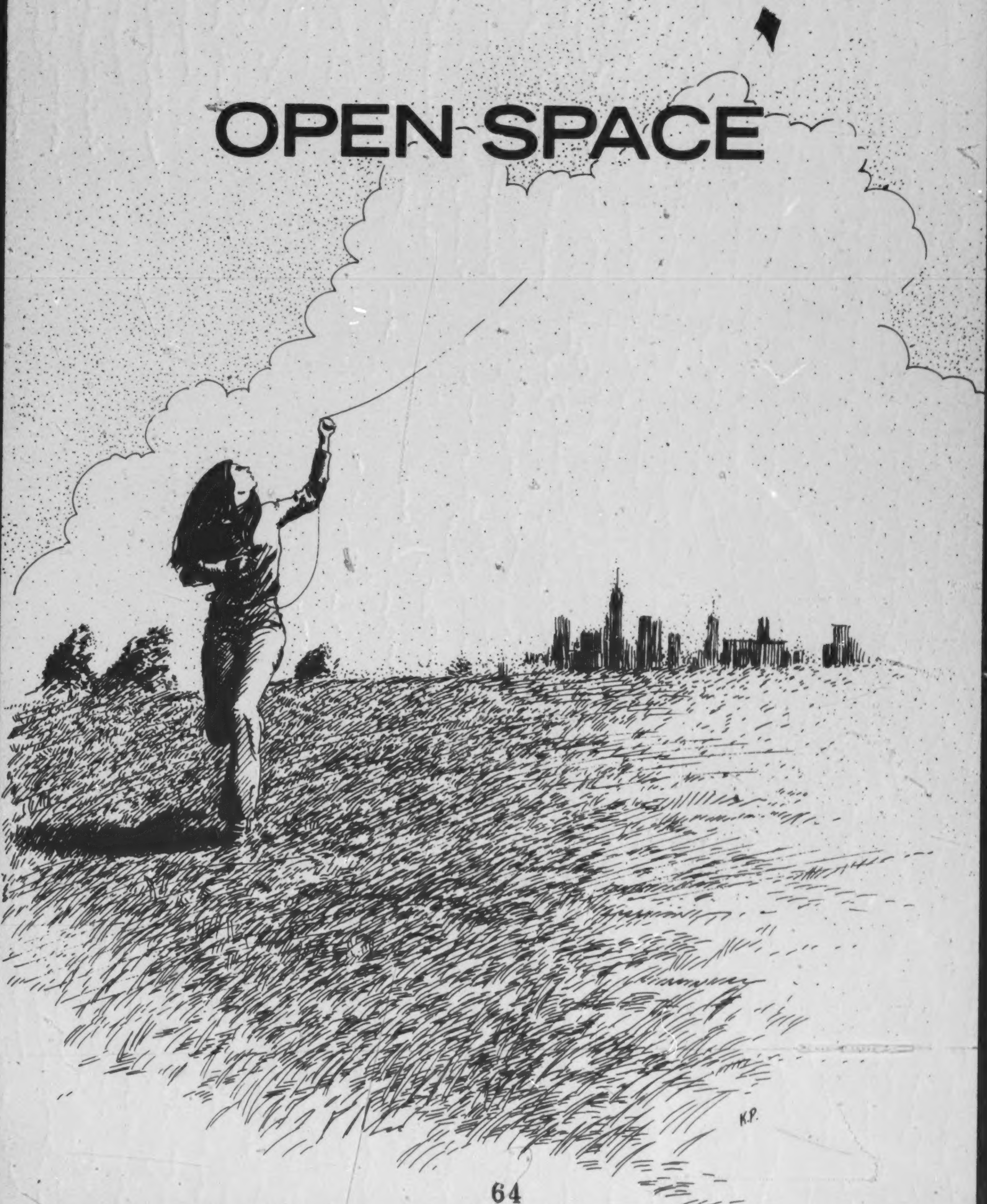
For site #3, we would like you to try an analysis yourself. On guide sheet #25 there is space for your notes. Turn off the recorder while you analyze site #3. GS #25

The surficial geology map is quite useful in providing us with information about the deposits underlying the soil. However, in analyzing the sites for their limitation or suitability for development, we incorporated information we had learned about the land's topography and the properties of land such as depth to the bedrock and the permeability of the deposit. In utilizing the surficial geology map alone, we are missing much detailed information provided by soil surveys. Any one map used alone, gives us only a part of the picture. To get the total picture, we must put together a jigsaw puzzle so to speak. We must make use of topography, soils, and surficial geology maps as well as all other resource information available.

We have come a long away, but the analysis must extend further. As the synthesis unit will explain; we have considered physical aspects of the land and have neglected such intrinsic considerations as social, economic, and political factors. A sound analysis must also consider off-site environmental impacts. Only when all these aspects have been put together will a logical land use planning decision result.

To summarize the implications of the geosystem on land use decision making, we have prepared a matrix listing the important geosystem considerations. The matrix explains the rationale for each consideration as well as indicating the need for protection, existing regulations, and the potential for higher development or maintenance costs. It will be useful for you to refer back to the matrix as you are synthesizing the considerations from other units to make your land use decisions. This concludes the geosystem unit. Thank you for joining us.

OPEN SPACE



OPEN SPACE

AND

LAND USE DECISION MAKING

UNIT DESIGNED AND WRITTEN BY:	DWIGHT G. SMITH
UNIT EDITED BY:	HARRY O. HAAKONSEN LARRY SCHAEFER
CONTENT CONSULTANT:	LES COREY

BE A RECYCLER YOURSELF. WRITE YOUR COMMENTS, NOTES, AND ANSWERS ON SCRAP PAPER INSTEAD OF THESE GUIDE SHEETS. IN THIS WAY, THESE GUIDE SHEETS WILL BE AVAILABLE FOR THE NEXT PERSON IN YOUR COMMUNITY WHO WILL BE MAKING USE OF THIS UNIT.

THE PROJECT PRESENTED HEREIN WAS PERFORMED PURSUANT TO A GRANT FROM THE U.S. OFFICE OF EDUCATION, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE. HOWEVER, THE OPINIONS EXPRESSED HEREIN DO NOT NECESSARILY REFLECT THE POSITION OR POLICY OF THE U.S. OFFICE OF EDUCATION, AND NO OFFICIAL ENDORSEMENT BY THE U.S. OFFICE OF EDUCATION SHOULD BE INFERRED.

THIS MATERIAL IS PRINTED ON PAPER MADE FROM RECYCLED FIBERS AT DIAMOND INTERNATIONAL CORPORATION, HYDE PARK, MASSACHUSETTS MILL.

SCORP CITIZEN SUMMARY AND LAND, THE MOST ENDURING GIFT PROVIDED BY CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION.

GUIDE SHEET #1

The land area of our state and country is fixed. As we experience economic expansion and population growth, we must recognize that competition for our limited land resources is going to increase. As people and development pressures increase, we must seriously evaluate our need for open space. Once we have determined our open space needs, we must take action to see that adequate open space is preserved to meet our needs.

This unit on open spaces provides several perspectives on the nature, function, and importance of open space areas. In addition, it reviews the agencies and laws which focus on man's need for open space. At the conclusion of the unit, there is a plan for action which will be of value to individual groups or communities which are involved in the preservation and management of open spaces.

OBJECTIVES: At the conclusion of this unit on open space, you should be able to:

1. Describe the types of open space that are located in or near your community.
2. Locate and identify municipal and state owned open space on the Statewide Comprehensive Outdoor Recreation Plan (S.C.O.R.P) and local land use maps.
3. Construct a list of benefits an individual and community can derive from open space preservation and management.
4. Cite evidence that demonstrates the need for proper planning for the future open space needs of your community.
5. Identify organizations involved in preserving and managing open space
6. Outline the provisions of the law as it relates to open space preservation and management.
7. Describe the role that open space plays in a community's plan for:
    a. providing adequate recreational facilities
    b. residential development
    c. commercial development
    d. industrial development
    e. maintaining wildlife habitat
    f. preserving historical sites
    g. long term economic and population growth
8. Outline a program for the preservation and management of a parcel of land in your community.

Before proceeding with the recorded portion of this unit, make sure you have a copy of Land and Statewide Comprehensive Outdoor Recreation Plan. Copies of both of these booklets have been included in the land use decision making kit . . . If you are ready, turn on the recorder!

GUIDE SHEET #2

IDEAS CONCERNING OPEN SPACE

A. Wilderness is the raw material out of which man has hammered the artifact called civilization.

-Aldo Leopold-

I find I am disoriented by space. New York City has taught me the solace of walls. I feel more comfortable in a subway than in a field, more willing to concentrate on something with momentum than a landscape that will not flicker or revolve. I do not absorb scenery: rather, it turns meditative and remote. Walking through the woods, I fall into that self-enclosing contemplation that one erects to prevent boredom.

-Richard Goldstein-

Open space is, generally undeveloped, or predominatly undeveloped land which has value for active or passive recreation . . . To be open space land need not entirely be undeveloped or unbuilt upon. Therefore, parks, greenbelts, farms, golf courses, your backyard, a zoo or even a cemetary may also be included in our definition of open space.

-Connecticut Land Planning Commission-

The term open space does not describe a particular type of land. It is simply a predominatly vacant land or water area of sufficient size, utility or beauty that its presence is a public benefit.

-Boston Metropolitan Area Planning Council-

B. List some spaces you encounter. Are they open spaces or enclosed spaces? Which ones do you value most? least?

Personal Spaces in your Life	Value		
	Great	Moderate	Little
1. Your Room			
2. Your Apartment or Home			
3. A Parking Space			
4. A Bus Seat			
5. Your Place at Work or School			
6. ________________			
7. ________________			
8. ________________			

Return to the narrative after you have finished the activity. Turn the tape recorder on again.

GUIDE SHEET #3

VALUES CLARIFICATION ACTIVITY ON OPEN SPACE

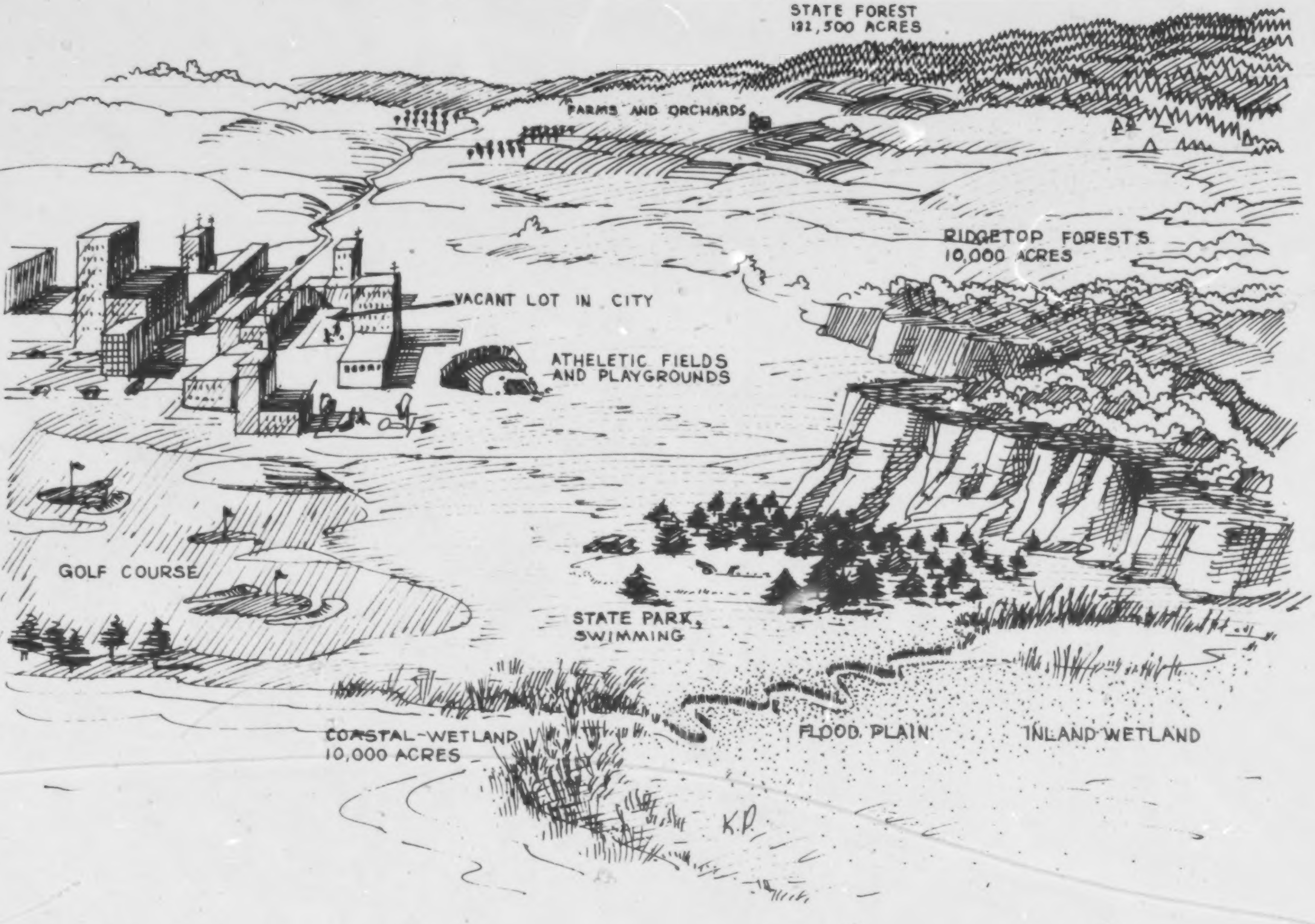
Instructions: Read the list of areas in the left hand column of this guide sheet. Then classify each area as being or nor being open space in your opinion. Finally, consider the areas you classified as open space and rate the area in terms of its importance to you.

Selected Areas	Is this area Open Space?		Importance of area to you (check one)		
	Yes	No	High	Moderate	Low
1. Playground					
2. Supermarket					
3. Farm					
4. Golf Course					
5. Orchard					
6. Cemetary					
7. Park					
8. Classroom					
9. Nature Preserve					
10. Parking Lot					
11. Marsh					
12. Sanitary Landfill					
13. Street					
14. Zoo					
15. Beach					
16. Forest					
17. Buffer Strip Along Highway					
18. River					
19. Ski Trail					
20. Athletic Field					
21. Ridgetop					
22. Deserted Warehouse					
23. Gymnasium					
24. Reservoir					
25. Railroad Yard					
26. Vacant Lot					
27. Tennis Courts					
28. Scenic Vista					
29. Skating Rink					
30. ____________					

When you have completed the activity, turn the tape recorder on.

CONNECTICUT'S OPEN SPACE

GUIDE SHEET #4



STATE FOREST
132,500 ACRES
FARMS AND ORCHARDS
RIDGETOP FORESTS
10,000 ACRES
VACANT LOT IN CITY
ATHELETIC FIELDS
AND PLAYGROUNDS
GOLF COURSE
STATE PARK,
SWIMMING
COASTAL-WETLAND
10,000 ACRES
FLOOD PLAIN
INLAND WETLAND
K.P.

GUIDE SHEET #5

ANALYSIS OF LOCAL AND REGIONAL OPEN SPACE

The following three tasks are designed to assist you in locating local and regional open space areas in the vicinity of your community. After locating several areas, you will be asked to state whether or not, in your estimate, they adequately or inadequately meet the needs of your community or region. After completing this unit, you may want to visit several of these areas to conduct on site analysis.

To complete the activity, you will need:

- pencil
- scrap paper
- Statewide Comprehensive Outdoor Recreation Plan (SCORP)
- optional: A local open space map for your town or regional planning agency

Task A:

1. A map of open space and recreational areas is included at the end of the SCORP Citizens' Summary. Open the map, study the legend and locate your community.
2. Measure the approximate distance from the center of your town to the nearest forest. Record the distance in the distance column below. Place a check in the local column if the forest is within your community or in the regional column if the forest is outside your community.
3. Repeat this process for each of the types of open space numbered 1 - 12 on the guide sheet.
4. After completing the inventory, rate each open space, adequate or inadequate, depending upon whether it meets your communities needs in terms of location, accessability and size.
5. When you have completed your evaluation, complete the questions listed in Task C.

I. Open Space Areas	Distance to area	Place check in column if:		Your evaluation of the adequacy of the site.	
		Local Area	Regional Area	Adequate	Inadequate
1. Forest					
2. Park					
3. Recreation Area					
4. Fish-Wildlife Area State Ponds					
5. Natural Areas					
6. Campground					
7. Heritage or Historical Site					
8. Boat Launching Site					
9. Municipal Open Space					
10. Private Open Space					
11. Water-Utility Watershed					
12. Hiking Trail					

GUIDE SHEET #5
(CONTINUED)

Task B (Optional):

1. Obtain a local open space map from your town or regional planning agency.

2. Measure the distance from your home to the open spaces lettered A - I on the local open space or the SCORP map and record the distance to the open space area in the distance column below.

3. Place a check mark in the appropriate column indicating whether or not the facility is adequate or inadequate for the needs of your community.

I. Open Space Areas	Distance to area	Place check in column if:		Your evaluation of the adequacy of the site.	
		Local Area	Regional Area	Adequate	Inadequate
A. Golf Course					
B. Tennis Courts					
C. Baseball, football or athletic field					
D. Fresh-water swimming					
E. Salt-water swimming					
F. Conservation Trust Property					
G. Ski Area					
H. Farms					
I. Vacant Lot					

Task C:

1. In your opinion, does your community have an adequate amount of open space to meet the needs of its citizens?

2. In your opinion, how far can an open space area be from the center of your community before it loses its value as open space?

3. Do you see a need for additional type of open space for your community? for your region? What type of open space areas are needed?

4. Are any of the open space areas in your community currently endangered by plans for urban or suburban development?

5. Who owns the open spaces that are important to you in your community?

Return to the narrative after you have completed this activity. Turn the tape recorder on!

GUIDE SHEET #6

OPEN SPACE FUNCTIONS

A. 1. Recreational Opportunities

2. Attractive Community Design

   a. diversity of environments
   b. need of "green" surroundings
   c. buffer zones

3. Maintenance of Natural Processes

4. Historical Preservations

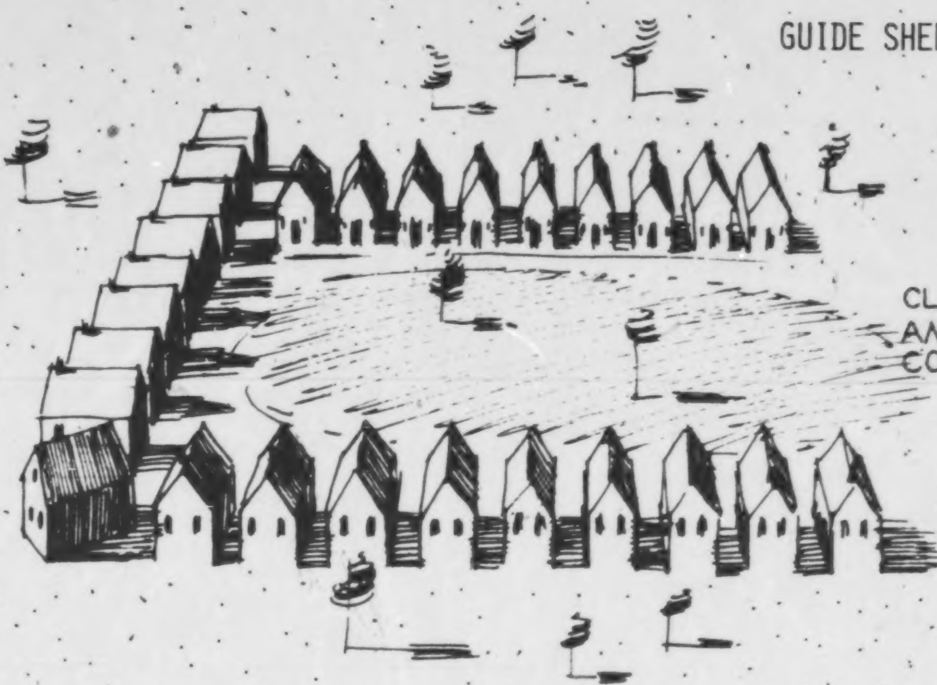
5. Rarity of habitat or species

B. Classify each open space area according to the function it performs by placing a check in the appropriate column. Each type of open space may have several functions.

Function Type	Recreation	Attractive Community Design	Maintenance	Historical	Rarity
Ski resort					
Farm					
State forest					
State park					
Water company land					
Local ridge					
Vacant lot					
Golf course					
Athletic fields					
Nature preserve					
Cemetary					
House where George Washington slept					
Hiking Trail					
Bicycle Trail					
Fishing or Hunting Preserve					

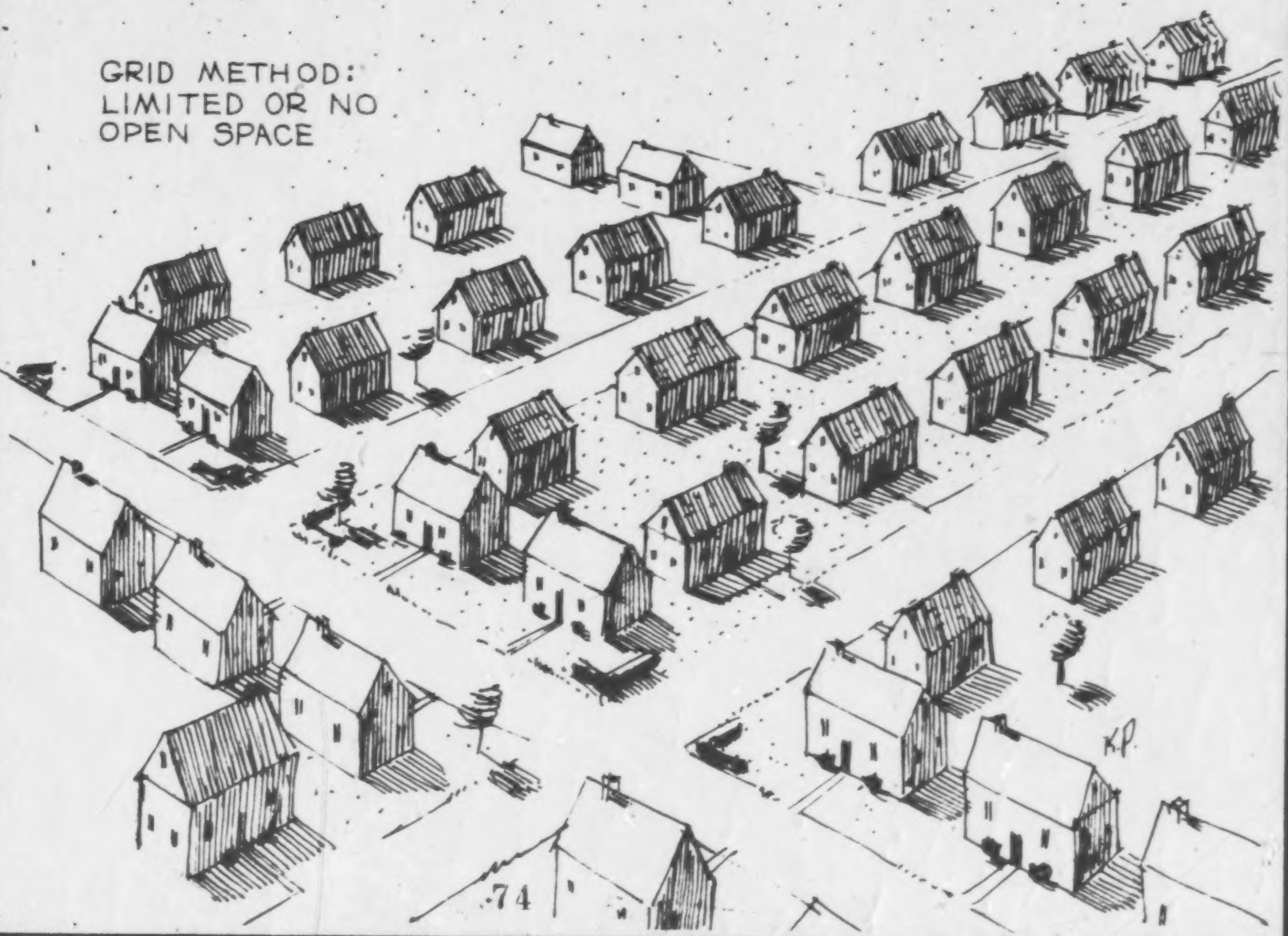
Return to the narrative after completing the activity. Turn the recorder on.

GUIDE SHEET #7



CLUSTER METHOD:
AMPLE OPEN SPACE
COMMONLY SHARED

GRID METHOD:
LIMITED OR NO
OPEN SPACE



GUIDE SHEET #9

CRITERIA FOR SELECTING NATURAL AREAS

The Nature Conservancy is a national, non-profit, membership organization devoted wholly to the preservation of critical areas. Since 1954, when it started it first land saving project, The Conservancy has helped preserve over 650,000 acres in 47 states and the Virgin Islands. These examples of natural America include marshes, seashores, forests, swamps, islands, prairies, and deserts, ranging in size from thousand acre habitats to bits of ecologically important but minute wetlands.

The Connecticut Chapter of The Nature Conservancy has helped preserve 88 sanctuaries encompasing more than 8,000 acres. Connecticut, caught in the piners of the spreading New York to Boston megalopolis, is especially vulnerable to the disappearance of natural areas.

As part of their management program each site undergoes an analysis and evaluation by a team of ecologists and other scientists. It is particularly interesting to note some of the characteristics they use in evaluating a site. They may be of interest to you in selecting and/or evaluating natural areas in your town.

I. ECOLOGICAL EVALUATION

A. Viability - The ability of areas to maintain the integrity of the natural system over time. (consider size, watershed, and bufferage).

B. Diversity - based on such factors as number of habitats represented, relative species diversity, etc.

C. Uniqueness - uniqueness or rarity of the ecosystem in the United States or in the state.

D. Freedom from Human Impact - three categories
-if there has been no appreciable influence by man
-if there has been some human interference but not enough to change natural community entity.
-if the area is dominated by man's influence

E. Defensibility - the ability to protect a natural area from destruction or alteration by man.

II. REASONS FOR PRESERVATION (more than one may be chosen)

A. Scenic

B. Scientific documentation

C. Buffer zone

D. Open Space

E. Geologic formations

F. Local rare aquatic habitat

G. Local rare terrestrial habitat

H. Animals peculiar to this region

I. Representative ecosystem

J. Breeding concentration

K. Overwintering concentration

L. Migratory concentration

M. Local rare animal

N. Remnant community

O. Plants peculiar to this region

P. Other

Source: Nature Conservancy, Connecticut Chapter Science Tower
P.O. Box MMM Wesleyan Station
Middletown, CT 06457

After reading guide sheet #9, turn the tape recorder back on!

Points of Interest

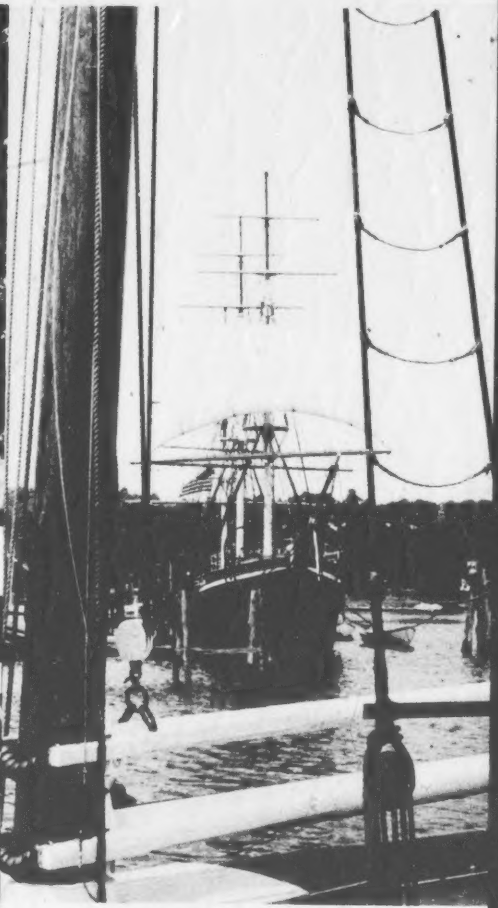
1776 1976 *Bicentennial Edition*

OPEN SPACE UNIT
GUIDE SHEET

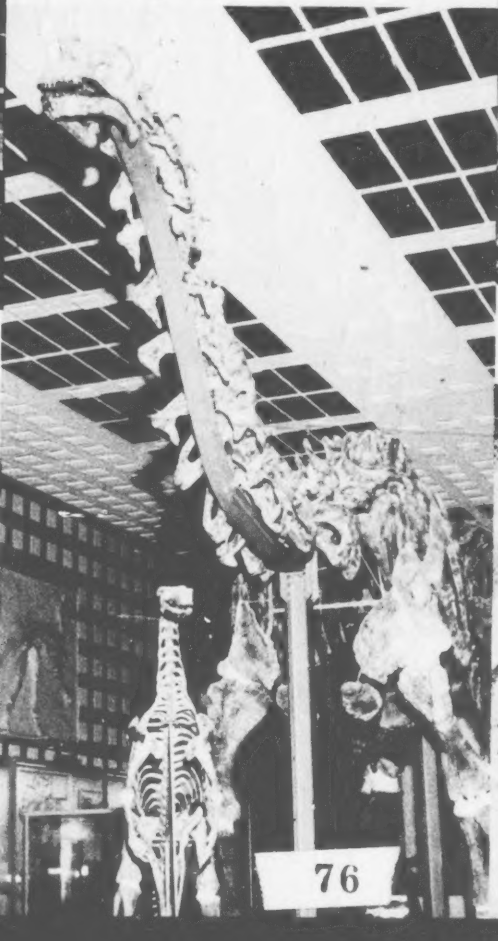
CT

CONNECTICUT *So much So near*

Shakespeare Theatre, Stratford.
Peabody Museum, New Haven.



Goodspeed Opera House, East Haddam.
Colt gun collection, Hartford.



Mystic Seaport, Mystic.
Wild Animal Farm, Willington.

CONNECTICUT

. . . is New England. Its interests are as varied as its life, its landscape and its traditions.

For the visitor, Connecticut's countryside is ever-changing. Rolling hills and deep wooded valleys merge with rugged uplands. New England farms and quiet colonial villages live door-to-door with bustling urban centers. Along the southern tier, the rambling shoreline of Long Island Sound is dotted with sandy beaches, pleasure boat marinas, great ports of call and quaint fishing villages.

All this is Connecticut—scenic, historic, colorful and compact.

This symbol indicates those attractions of Bicentennial interest.

Because hours and prices tend to change without notice, it is advisable to recheck them in advance to avoid disappointment.

Avon

FARMINGTON VALLEY ARTS CENTER, Route 44. Arts and crafts studios, gallery, bookstore housed in historic stone explosives plant. Studios open Tuesday-Sunday 10-5; gallery open Wednesday-Saturday 11-3, Sunday 1-4. Closed Monday, Christmas, New Year's. Free. Tel: 678-1867.

Branford

THIMBLE ISLANDS CRUISE. Sightseeing tours through the tiny Thimble Islands leave Stony Creek Public Dock daily. For operating schedule, rates: 488-9978 or 481-3345.

Bridgeport

P.T. BARNUM MUSEUM, 804 Main St. Barnum memorabilia; possessions of Tom Thumb, Jenny Lind; 19th century carved Swiss Village; Brinley 5-Ring Circus Model; unwrapped Egyptian mummy; exhibits of local historical importance. Tuesday-Saturday 12-5, Sunday 2-5. Closed holidays. Donation. Tel: 333-8551.

BEARDSLEY ZOOLOGICAL GARDENS, Noble Ave. (Beardsley Park). Largest zoo in Connecticut. Specializes in fauna of North and South America. Open all year (summer 10-7, winter 10-5). Closed Thanksgiving, Christmas, New Year's. Adults 25¢, children 10¢. Groups by appt. Tel: 576-8082.

MUSEUM OF ART, SCIENCE & INDUSTRY, 4450 Park Ave. Three floors of exhibits include art, energy, circus life, antique furniture, Indians, science. Tuesday-Sunday 2-5. Free. Planetarium shows: Tuesday, Thursday 3:30; weekends 2, 3, 4. Planetarium: adults $1, children 50¢. Tel: 372-3521.

LONG ISLAND CRUISES. Daily cruises to Port Jefferson, L.I., leave Union Square Dock from late May to mid-October. For schedules, rates: 367-8571 or 334-5993.

Bristol

AMERICAN CLOCK & WATCH MUSEUM, 100 Maple St. Only U.S. museum devoted exclusively to horology. More than 600 items dating from 1790, most manufactured in Connecticut. Open April to November: Tuesday-Sunday 1-5. Adults $1, children 50¢; group rates. Tel: 583-6070.

BARNES MEMORIAL NATURE CENTER, 175 Shrub Rd. Self-guiding trail leads througn 70-acre preserve. Variety of habitats with emphasis on stages of ecological succession. Interpretive building with displays. Tuesday-Friday 1-5, weekends 9-5. Closed major holidays, month of January. Free. Tel: 589-6082.

LAKE COMPOUNCE AMUSEMENT PARK, Lake Ave. Rides, games, entertainment, showboat tours of the lake, other fun things for the family. Open daily: Memorial Day-Labor Day; weekends only: Easter-late May, September. Parking: Sunday, holidays 50¢.

Canaan

POST CARD MUSEUM, Church St. Thousands of domestic and foreign cards, most of them old and very rare. June-August: weekends 12-4; other by appt. or chance. Adm: 99¢. Tel: 824-0397.

Canterbury

PRUDENCE CRANDALL HOUSE, junction of Routes 169, 14. Georgian-style home where Miss Crandall, in 1833, established state's first all-Black school. Under development as a museum of Black history and culture. Expected opening: late 1975.

Canton

CANTON HISTORICAL SOCIETY, 11 Front St., Collinsville. Crafts center, country store, Victorian parlor and furnishings, toys, blacksmith shop, farm tools, etc. All year: Tuesday-Thursday 12-4, Sunday 2-5. Adults $1, children 25¢; special group, student rates. Tel: 693-2793.

ROARING BROOK NATURE CENTER/ENVIRONMENTAL CENTERS INC., 176 Gracey Rd. Interpretive buildings with year-round nature exhibits, store, resource room, 115 acres of woodland with many trails. All year: Tuesday-Friday 10-4:30, Saturday 10-5, Sunday 1-5. Closed major holidays. Free. Tel: 693-0263.

Clinton

STANTON HOUSE (c. 1790), 63 East Main St. Part home, part general store. Almost all furnishings original. Extensive collection of old American and Staffordshire dinnerware. May-Nov. 1: Tuesday-Sunday 2-5 (July, August 11-5). Free. Tel: 669-2132.

Colebrook

COLEBROOK HISTORICAL SOCIETY, Town Hall. Many displays dealing with local history. Memorial Day-Columbus Day: weekends, holidays 2-4. Free.

Coventry

NATHAN HALE HOMESTEAD, South St. Deacon Richard Hale, father of the patriot, built the house in 1776 and held court there as a justice of the peace. Its 10 rooms are furnished as the Hales might have had them; many family heirlooms. May 15-Oct. 15: daily 1-5. Adults $1, children 25¢. Tel: 247-8996.

Danbury

DANBURY SCOTT-FANTON MUSEUM, 43 Main St. Taylor House (1750) filled with early American crafts, furnishings. Dodd House recalls heyday of city's hat industry, has manufacture displays. Exhibition building contains many items of local historical importance. Wednesday-Sunday 2-5. Closed major holidays. Free. Tel: 743-2475.

Darien

BATES-SCOFIELD HOMESTEAD (c. 1730), 45 Old King's Hwy. Classic Connecticut saltbox with massive center chimney. Authentic local furnishings, crewel embroidered curtains, excellent herb garden. Wednesday, Thursday 2-4; Sunday 2:30-4:30; other by appt. Free. Tel: 655-9233.

Deep River

STONE HOUSE (1840), South Main St. Museum of 19th century furnishings. Extensive collections of cut glass (locally produced), many local history items. Summer: Tuesday, Thursday 2-4; other by appt. Donation. Tel: 526-2609.

East Granby

OLD NEW-GATE PRISON & COPPER MINE, Newgate Rd. America's first chartered copper mine (1707), Revolutionary War prison (1775-1782), and Connecticut's first state prison (1776-1827). Visitors may tour copper mine where prisoners were chained at night. National Historic Landmark. Memorial Day to November: daily 10-4:30. Adults $1, children 50¢. Groups by appt. Tel: 653-3563 or 566-3005.

East Haddam

GOODSPEED OPERA HOUSE, Route 82 at bridge. Beautifully restored 1876 Victorian opera house offers vintage musical comedy and other summer theater productions mid-June to early fall. Tel: 873-8668.

NATHAN HALE SCHOOLHOUSE, Main St. (rear of St. Stephen's Church). One-room school where Hale taught during winter of 1773. Furnished as a school of the period, includes some Hale memorabilia. Summer: weekends 2-5. Donation.

East Haven

BRANFORD ELECTRIC RAILWAY MUSEUM, River St. More than 85 classic trolleys displayed. Three-mile shoreline ride includes tour of car barns. Picnic facilities. Mid-June to Labor Day: Weekdays 10-5; April to December: weekends, holidays 11-6. Closed December-March. Museum free. Rides: adults $1 ($1.50 for one day unlimited rides), children half price. Tel: 469-9627.

East Lyme

THOMAS LEE HOUSE (1660) and LITTLE BOSTON SCHOOL (19th century), Route 156, Niantic. House is one of state's oldest frame dwellings. Interior beautifully furnished, shows various stages of construction. Restored school has period furnishings. Memorial Day-Columbus Day: daily except Tuesday 10-5. Adults 75¢, children 25¢. Tel: 739-6070.

Branford Trolley Museum, East Haven.

Essex

PRATT HOUSE & MUSEUM (1740), 20 West Ave. Architecturally interesting house contains outstanding Griswold collection of American furnishings—including many "Chinese" courting mirrors. Period herb garden is fully labeled. June-October: Tuesday, Thursday, Saturday 1-5. Adults 50¢, under 12 free. Tel: 767-1003.

RIVERBOAT. Riverboat cruises along the Connecticut River depart from Town Dock, foot of Main St. from May to November. Some cruises connect with Connecticut Valley Railroad. (See also Haddam, Old Saybrook.) For schedules, rates: 767-8806.

VALLEY RAILROAD, Railroad Ave. Vintage steam train carries passengers on hour-long round trip to Chester from May to November. Optional connection with riverboat for extended cruise on the Connecticut River. Christmas trains on December weekends. For schedules, rates: 767-0103.

Fairfield

BIRDCRAFT MUSEUM, 314 Unquowa Rd. Collection includes more than 4,000 specimens of native birds and other wildlife. All year: Saturday 10-5, Sunday 12-5. Closed Easter, Thanksgiving, Christmas. Free. Tel: 259-6305.

FAIRFIELD HISTORICAL SOCIETY, 636 Old Post Rd. (opposite Town Hall). Excellent collections of antique dolls, kitchenware and other items of historical value. Weekdays 9:30-4:30. Free. Tel: 259-1598.

LARSEN SANCTUARY, 2325 Burr St. Headquarters of Connecticut Audubon Society. Displays of local wildlife, fine research library. Five miles of trails in 150-acre sanctuary. Tuesday-Saturday 10-5, Sunday 12-5. Closed major holidays. Contribution: 50¢. Tel: 259-6305.

OGDEN HOUSE (c. 1700), 1520 Bronson Rd. Faithfully restored colonial structure, furnished with priceless period antiques. Well-maintained gardens. May 15- Oct. 15: Thursday, Saturday 2-5. Adults $1, children 50¢. Tel: 259-1598.

Farmington

FARMINGTON MUSEUM (Stanley-Whitman House), 37 High St. This 1660 homestead, beautifully restored, has lovely period furnishings, artifacts, beautiful herb, flower gardens. National Historic Landmark. April-December: Tuesday-Saturday 10-12, 2-5; Sunday 2-5; December-April: Friday, Saturday 10-12, 2-5; Sunday 2-5. Closed major holidays. Adults $1, children 50¢. Tel: 677-9222.

HILL-STEAD MUSEUM, 671 Farmington Ave. Gracious turn-of-century mansion, designed by Stanford White for industrialist Alfred Pope. Outstanding collection of Impressionist paintings. Furnishings reflect family's opulent life style. All year: Wednesday, Thursday, Saturday, Sunday 2-5. Closed Thanksgiving, Christmas. Adults $1, children 50¢. Tel: 677-9064.

Glastonbury

WELLS-SHIPMAN-WARD HOUSE (1755), 972 Main St., South Glastonbury. Outstanding example of mid-18th century Connecticut River Valley architecture. Excellent period furnishings. Beautiful garden at rear of house. June to mid-October: Sunday 2-4. Adults 50¢, children 25¢. Tel: 633-6890.

Granby

McLEAN GAME REFUGE. Sanctuary's 3,400 acres have many trails through various terrain. Main entrance off Route 10. Brookside picnic grove and recreation field reached through west entrance on Barndoor Hills Rd.

Greenwich

AUDUBON CENTER, Riversville Rd. A 475-acre sanctuary with many trails, excellent visitors center. Tuesday-Saturday 9-5. Closed on three-day holiday weekends. Adults $1, children 50¢. Tel: 869-5272.

BRUCE MUSEUM, Steamboat Rd. Outstanding exhibits in natural history, science. Hall of Biology, meteorites, Indian artifacts. Special three-dimensional displays. Weekdays 10-5, Sunday 2-5. Closed holidays. Free. Tel: 869-0376.

BUSH-HOLLEY HOUSE (c. 1685), Strickland Rd., Cos Cob. Colonial saltbox has wallpaper bearing tax stamp of George II, a hidden stairway, rare examples of Colonial furniture. All year: Tuesday-Saturday 10-12; summer: also Sunday 2-5; winter: Sunday 2-4. Adults $1. Tel: 869-9849.

MUSEUM OF CARTOON ART & HALL OF FAME, 384 Field Point Rd. Unique 500-piece collection of original cartoons, from Thomas Nast and Charles Dana Gibson to Peanuts. Classic comic strips of 20th century. Tuesday-Friday 10-4, Sunday 1-5. Closed Saturday, Monday, major holidays. Adults $1, children 50¢. Tel: 661-4502.

PUTNAM COTTAGE (c. 1792), 243 East Putnam Ave. Known as Knapp's Tavern during Revolution. Meeting place of leaders (including Israel Putnam). Has rare scalloped shingles, huge fieldstone fireplaces. Monday, Thursday-Saturday 10-5. Adults 50¢, children free. Tel: 869-9697.

Groton

FORT GRISWOLD STATE PARK, Monument & Park Aves. Site of 1781 massacre of Colonial defenders by British troops under Benedict Arnold. Memorial tower provides fine view of surrounding country; many emplacements restored. Museum has historical displays. Park open year-round. Museum, monument: Memorial Day-Columbus Day. Free. Tel: 445-1729.

SEE SUBMARINES BY BOAT, 86 Fairview Ave. Hour-long, seven-mile tours of historic Thames River and New London harbor include U.S. Sub Base, Electric Boat Co. (nuclear sub construction), Groton Monument, U.S. Coast Guard Academy. Late May-mid Sept.: daily 9 to hour before sunset. Adults $2.75, children $1. Tel: 445-7401.

U.S. NAVY SUBMARINE BASE, Route 12. Two-hour weekend tour of this Atlantic submarine fleet home port includes inspection of midget subs, and visits to submarine museum and pier areas. Arrangements through Gray Line of New London-Mystic, 24 Hamilton St., New London, CT 06320. Tel: 443-1831. Closed Dec. 15-Jan. 15. Adults $2.50, children $1.25.

Guilford

THOMAS GRISWOLD HOUSE (1735), Boston St. Lovely Colonial saltbox home, now a museum of local history. Rare craft and industrial tools housed in blacksmith shop at rear. Summertime: Wednesday-Sunday 11-5. Adults 50¢, children free. Tel: 453-3176.

HYLAND HOUSE (1660), 84 Boston St. Classic Colonial saltbox has rare furnishings, unusual interior woodwork. First American town clock made here; now displayed at nearby Whitfield House. June-September: Tuesday-Sunday 10-4:30. Adults 50¢, children free: Tel: 453-9477.

WHITFIELD HOUSE MUSEUM, Whitfield St. New England's oldest stone house (1639-40), originally a parsonage, fort and community hall. Beautifully furnished. Excellent backdoor herb garden. May-November: Wednesday-Sunday 10-5; November-May 10-4. Closed major holidays, also Dec. 15-Jan. 15. Adults 50¢, children free. Tel: 453-2457.

Haddam

RIVERBOAT. Riverboat cruises along the Connecticut River and across Long Island Sound depart from Steamboat Landing, Route 82. (See also Essex, Old Saybrook.) For schedules, rates: 345-4507.

THANKFUL ARNOLD HOUSE (1795), Walkley Hill. Interesting decor includes unusual paneling, many rare and beautiful period antiques. June-October: weekends 2-5. Free. Tel: 345-2400.

Hadlyme

GILLETTE CASTLE STATE PARK, Route 148. Hilltop fieldstone mansion, resembling medieval castle, overlooks Connecticut River. Built in 1919 as private home by actor William Gillette. Interior filled with unique hand-carved fixtures created by Gillette. Memorial Day-Columbus Day: daily 11-5. Admission: 50¢.

Hamden

JONATHAN DICKERMAN HOUSE (1770), Mt. Carmel Ave. Unusually well preserved home, furnished in keeping with early family life of period. May to mid-October: weekends 2-5. Free. Tel: 248-6684.

Hartford

BUTLER-McCOOK HOMESTEAD (1782), 396 Main St. Rare historic survivor of a changing urban area. Architecture and furnishings reflect evolution in tastes from 18th century to Victorian period. Carriage house museum is at rear of house. May 15-Oct. 15: daily 1-5. Adults $1, children 25¢. Tel: 247-8996.

CONNECTICUT HISTORICAL SOCIETY, 1 Elizabeth St. Extensive museum collection of Connecticut art and furnishings, reference library of history and genealogy. Museum: June-Labor Day: weekdays 1-5; Labor Day-June: Monday-Saturday 1-5. Library open all year: Monday-Saturday 9-5 (closes Saturday noon in summer). Also closed major holidays. Free. Tel: 236-5621.

NOOK FARM, Farmington Ave. at Forest St. Restored homes of Mark Twain, Harriet Beecher Stowe. Visitor Center with special displays, research library. Original furnishings and decor. Mid-June to Labor Day: daily 10-5; Labor Day to mid-June: Tuesday-Saturday 9:30-4, Sunday 1-4. Closed Monday, Tuesday in January, February; also closed major holidays. Combined tour: adults $2, children $1. Groups by appt. Tel: 525-9317.

Old State House, Hartford.

OLD STATE HOUSE, 800 Main St. Designed by Charles Bulfinch, building was State Capitol from 1796 to 1878, then Hartford City Hall to 1915. Chambers now restored with many original furnishings. National Historic Landmark. Tuesday-Saturday 12-4. Closed major holidays. Adults 50¢, children 10¢. Groups by appt.; special rates. Tel: 522-6766.

STATE CAPITOL, Capitol Ave. Great gold-domed building became seat of government in 1878. Top executive offices, legislative chambers and facilities. Many historic displays (Lafayette's camp bed, many bullet-riddled battleflags, etc.). Tours by appt. Tel: 566-3945.

STATE LIBRARY, Capitol Ave. (opposite State Capitol). Priceless historic displays: original Royal Charter, Colt Collection of Firearms (six shooters worn by Wild Bill Hickok and Bat Masterson), other products and artifacts made in Connecticut. Weekdays 9-5, Saturday 9-1. Closed Sunday, major holidays. Free. Tel: 566-3056.

WADSWORTH ATHENEUM, 600 Main St. Nationally ranked art museum: 65 galleries cover every major period—painting, sculpture, porcelain, silver, glass, firearms, textiles, furniture, etc. Tuesday-Saturday 11-4, Sunday 1-5. Closed major holidays, month of August. Contribution: adults $1, others 50¢. Tel: 278-2670.

Kent

KENT FALLS STATE PARK, Route 7. Scenic roadside parkland dominated by 200-foot cascade. Especially lovely in spring season. Wide path follows fall to the top. Picnicking, recreation area, small campground across road. Free.

SLOANE-STANLEY MUSEUM & KENT FURNACE, Route 7. Outstanding collection of early American craft and domestic tools, many dating from 17th century, displayed in attitudes of use. Grounds include ruins of Kent iron furnace, part of Connecticut's 19th century iron smelting industry. Memorial Day to November: Wednesday-Sunday 10-4:30. Adults 50¢, children 25¢. Tel: 927-3849 or 566-3005.

Lebanon

JONATHAN TRUMBULL HOUSE (1735) & REVOLUTIONARY WAR OFFICE, Lebanon Green. Home of only colonial governor to support independence. Many unusual design features, furnished with period antiques. War Office was used by Trumbull to direct colony's massive supply effort for Continental Army. National Historic Landmark. May-November: Tuesday-Saturday 1-5. Adults 50¢, under 12 free. Tel: 642-7558.

Litchfield

LITCHFIELD HISTORICAL SOCIETY, Litchfield Green. Local historical exhibits, decorative arts, textiles, textile machinery, pewter, other local crafts. Good local history research library. Mid-May to mid-October: Tuesday-Saturday 11-5; other times: Tuesday-Saturday 2-4. Closed January, February, major holidays. Free. Tel: 567-5862.

LITCHFIELD NATURE CENTER & MUSEUM (White Memorial Foundation), Route 202. State's largest nature center (4,000 acres), many trails and recreation areas. Excellent nature displays in museum include 3,000-specie butterfly collection (seen by appointment). All year: Tuesday-Saturday 9-5; May-November: also Sunday 2-5. Closed Christmas, New Year's, July 4. Free. Guided tours by appt. Tel: 567-0015.

TAPPING REEVE HOUSE & LAW SCHOOL, South St. America's first law school (1784); graduates included Aaron Burr, 2 U.S. Vice Presidents, 130 members of Congress. House has finely furnished period rooms. Mid-May to mid-October: Tuesday-Saturday 11-5, Sunday 2-5. Closed July 4, Labor Day Weekend. Adults $1, children 50¢. Group rates. Tel: 567-5862.

Madison

HAMMONASSET BEACH STATE PARK, Route 1. Largest of Connecticut's shoreline parks. Two mile beach, facilities for swimming, camping, picnicking. Concessions. Parking $1.

NATHANIEL ALLIS HOUSE (c. 1785), Route 1. Also known as Bushnell Homestead, after man who promoted Civil War ship "Monitor." Excellent period rooms, collections of dolls, tools, other equipment, Madison-built ship models (including scale model of "Monitor"). Mid-June to mid-Sept.: Wednesday-Sunday 10-5. Closed July 4. Adults 50¢, children free. Tel: 245-4567.

Manchester

CHENEY HOMESTEAD (c. 1780), 106 Hartford Rd. Built by farmer-clockmaker Timothy Cheney. Birthplace of brothers who launched Connecticut's once-prominent silk industry. Many fine 18th and 19th century furnishings. Thursday, Sunday 1-5. Closed major holidays. Adults 50¢, under 16 free when with adult. Tel: 643-5588.

LUTZ JUNIOR MUSEUM, 126 Cedar St. A "do touch" museum to encourage self-discovery through handling displays and participating in special projects. Changing exhibits in natural history, ethnology, science, industry. Also nearby nature center. Tuesday-Sunday 2-5. Closed August, major holidays. Free. Tel. 643-0949.

Meriden

ANDREWS HOMESTEAD (1760), 424 West Main St. Fine center-chimney saltbox filled with period antiques, most made in Meriden. Sunday, Wednesday 2-5; other by appt. Closed holidays. Adults $1, children free. Tel: 237-5079.

CASTLE CRAIG (Hubbard Park), Route 66 west. Great crenelated tower dominates "Hanging Hills." Extraordinary view of countryside from Long Island Sound to central Connecticut. Free.

Middlebury

LAKE QUASSAPAUG AMUSEMENT PARK, Route 64. Family playground rides and games, good swimming and picnic facilities. Concessions. Memorial Day-Labor Day: daily; May, September: Sunday only. Parking 50¢.

Middletown

GENERAL MANSFIELD HOUSE (1810), 151 Main St. Home of Civil War Union general contains many personal effects, documents, period furnishings. Wednesday 3-5, other by appt. Contribution. Tel: 346-0764.

Montville

FORT SHANTOK STATE PARK, Route 32. Site of Mohegan Indian village, fort of Chief Uncas. Indian tribal burying grounds. Picnic, recreation facilities. All year.

Moodus

AMASA DAY HOUSE (1816). Moodus Green. Furnished with generations of Day family heirlooms; unusual stairwell stenciling, noteworthy collections of ceramics, wrought iron, toys, mirrors, clocks. May 15-Oct. 15: daily 1-5. Adults 50¢, children, 25¢. Tel: 247-8996.

Mystic

DENISON HOMESTEAD (1717). Pequotsepos Ave. Unique interior construction reflects five distinct eras—1717 to 1910. Completely furnished with Denison family heirlooms. June-November: daily 1-5, other by appt. Adults $1, children 25¢. Tel: 536-9248.

DENISON PEQUOTSEPOS NATURE CENTER, Pequotsepos Ave. Excellent 125-acre sanctuary has self-guiding trails, trail for the blind, natural history museum with interpretive displays. April-November: Monday-Saturday 9-5, Sunday 1-5; November-April: Tuesday-Saturday 10-5, Sunday 1-5. Closed major holidays. Adults 50¢, children 25¢. Tel: 536-1216.

HARBOR CRUISE. Colorful, coal-fired steamboat cruises between Mystic Seaport and Mystic Bridge. Evening departures for Noank. For schedules, rates: 536-2631.

MEMORY LANE. Olde Mistick Village. Route 27 at I-95. Old-time dolls and toys—American and European. Also antique cradles, doll houses (completely furnished), hobby horses. Open daily. Adults 50¢, children 25¢. Tel: 536-3450.

MYSTIC MARINELIFE AQUARIUM, Route 27 at I-95. Over 2,000 denizens of the deep displayed in ultra-modern home. Hourly dolphin and whale shows in 1,400-seat theater. May 15-Sept. 15: daily 9-8; Sept. 15-May 15: daily 9-6. Closed Thanksgiving, Christmas, New Year's. Adults $3.75, children $1.75; group rates. Tel: 536-3323.

MYSTIC SEAPORT, Route 27. Nationally acclaimed "living" museum, 19th century maritime village with authentic ships, shops, homes, crafts. *Charles W. Morgan*, last of the wooden whalers. Outstanding maritime displays, planetarium. Daily 9-5 (4 in winter). Closed Christmas, New Year's. Adults $4.25, children $1.75 (slightly lower in winter). Group rates. Tel: 536-2631.

New Britain

NEW BRITAIN MUSEUM OF AMERICAN ART. 56 Lexington St. Outstanding collection of 18th, 19th, 20th century American art. More than 1,500 items. Tuesday-Sunday 1-5. Closed major holidays. Free. Tel: 229-0257.

NEW BRITAIN'S YOUTH MUSEUM, 28 High St. Exhibits of natural history, local history, other nations. Live animals. William Judd Memorial Circus Collection. All year: Monday-Friday 2-5; September-May: also Saturday 10-4. Free. Tel: 225-3020.

New Canaan

NEW CANAAN BIRD SANCTUARY & WILDLIFE PRESERVE. Old Stamford Rd. Woodlands covering 18 acres with trails, ponds, brooks, bridges. Daily 8-dusk.

NEW CANAAN HISTORICAL SOCIETY, 13 Oenoke Ridge. Main house has costume museum, old drug store, research library. Hanford-Silliman House (1764) next door has fine old pewterware; on the grounds are old print shop, tool museum, 19th century schoolhouse. Nearby John Rogers Studio Museum displays work of 19th century sculptor, is a National Historic Landmark. Tuesday-Friday, Sunday 2-4. Closed holidays. Adults $1, children free. Tel: 966-1776.

NEW CANAAN NATURE CENTER, 144 Oenoke Ridge. Excellent nature displays, greenhouse plantings, special seasonal events, trails for exploration. Mid-June to mid-Sept.: Tuesday-Friday, Sunday 1-5, Saturday 10-5; mid-Sept. to mid-June: Tuesday-Saturday 10-5, Sunday 1-5. Closed Thanksgiving, Christmas, New Year's. Free. Tel: 966-9577

Silvermine Guild of Artists, New Canaan.

SILVERMINE GUILD OF ARTISTS, 1037 Silvermine Rd. Outstanding galleries offer special shows throughout year including prestigious New England Exhibit. Daily 12:30-5. Closed Thanksgiving, Christmas, New Year's. Free. Tel: 966-5617.

New Fairfield

SQUANTZ POND STATE PARK, Route 39. Excellent large inland recreation area for swimming, boating. All facilities, concessions. Wooded picnic areas along lake shore. Parking: $1.

New Haven

YALE UNIVERSITY. Guided tours of historic campus, by appointment, start at Phelps Gateway, off College Ave. at New Haven Green. Tel: 436-8330.

YALE UNIVERSITY ART GALLERY, 111 Chapel St. Nation's oldest college art museum. Outstanding collections include masterworks from every major period of art. Tuesday-Saturday 10-5; Sunday 2-5; also Thursday 6-9. Closed Monday, major holidays. Free. Tel: 436-0574.

BEINECKE RARE BOOK & MANUSCRIPT LIBRARY (Yale), 121 Wall St. Extraordinary modern building is world's largest structure devoted to special collections. Many displays, including Gutenberg Bible. Weekdays 8:30-4:45; Saturday 8:30-12:15, 1:30-4:45; Sunday 2-4:45. Free. Tel: 436-8438.

PEABODY MUSEUM OF NATURAL HISTORY (Yale), 170 Whitney Ave. Outstanding exhibits in geology, ecology, natural history. Largest natural history painting in the world. Monday-Saturday 9-5, Sunday 1-5. Closed major holidays. Free on Monday, Wednesday, Friday. Other days: adults 75¢, children 25¢. Tel: 436-0850.

STERLING MEMORIAL LIBRARY (Yale), 120 High St. Central unit of university library system with more than six million volumes—one of the world's largest. Monday-Thursday 8:30 am-midnight; Friday, Saturday 8:30-5, Sunday 2-midnight. Free. Tel: 436-8335.

EAST ROCK PARK, East Rock Rd. Winding road leads to magnificent overview of busy New Haven harbor and Long Island Sound. Monument, floodlighted and visible for miles at night, is memorial to city's war dead.

NEW HAVEN COLONY HISTORICAL SOCIETY, 114 Whitney Ave. Museum has a variety of historical exhibits, research library, recreated colonial rooms, fine furnishings, excellent collection of antique dolls and toys. Tuesday-Friday 10-5, weekends 2-5. Closed major holidays. Free. Groups by appt. Tel: 562-4183.

PARDEE-MORRIS HOUSE (1680), 325 Lighthouse Rd. Exceptionally well restored colonial home, authentically furnished. Nearby coach house has special displays. May-November: Monday-Friday 10-5, Sunday 2-5. Closed major holidays. Free. Tel: 467-0764.

WEST ROCK NATURE RECREATION CENTER, Wintergreen Ave. Year-round center has native birds, reptiles, mammals, nature crafts buildings, trails, many recreation facilities. Open daily: park, 9 to hour after sunset; zoo, 10-4:15. Free. Tel: 389-5519.

WINCHESTER GUN MUSEUM, 275 Winchester Ave. Oldest firearms museum in nation. More than 1,000 pieces covering world-wide history of firearms. Monday-Saturday 9-4. Closed major holidays. Free. Tel: 777-7911.

New London

BLOCK ISLAND CRUISES. Daily cruises to Block Island leave pier north of railroad station. For schedules, rates: 442-7891 or 442-9553.

CONNECTICUT ARBORETUM & THAMES SCIENCE CENTER (Connecticut College campus), Williams St. One of the East's finest small nature preserves and nature study areas. Center has interpretive environmental exhibits, and information about the arboretum. Arboretum open daylight hours; Center: Monday-Saturday 9-5, Sunday 1-5. Both free. Tel: 442-5391 (arboretum) and 442-0391 (center).

DESHON-ALLYN HOUSE (1829), 613 Williams St. Built by prominent whaling captain, house contains many original Federal furnishings. National Historic Landmark. Tuesday-Saturday 1-5, Sunday 2-5. Closed major holidays. (Lyman Allyn Museum provides guide.) Free. Tel: 443-2545.

FISHERS ISLAND CRUISE. Daily departures for Fishers Island are scheduled from New London. For schedules, rates: 443-6851.

HEMPSTED HOUSE (1678), 11 Hempstead St. One of the few remaining 17th century homes in Connecticut. Faithful restoration based on detailed diary descriptions of its builder. Showcase of early American furnishings and utensils. May 15-Oct. 15: daily 1-5. Adults 50¢, children 25¢. Tel: 247-8996.

LONG ISLAND CRUISES. Daily cruises to Orient Point, L.I., leave from Pequot Ave. dock. For schedules, rates: 443-5281 or 443-5035.

LYMAN ALLYN MUSEUM (Connecticut College campus), Williams St. Permanent exhibits include major periods of art, antiquities. Outstanding Baratz collection of doll houses, doll furniture, dolls, and toys. Tuesday-Saturday 1-5, Sunday 2-5. Closed major holidays. Free. Tel: 443-2545.

MORAN NATURE CENTER & ZOO, Chester St. Municipal park with a fine, small zoo. Farm animals in barnyard setting may be visited June-September: daily 12-5. Park has recreation, picnic facilities. Open all year 9 to dusk.

OCEAN BEACH PARK, Ocean Ave. Major recreation area offers amusement park, ocean and pool swimming, miniature golf, picnicking and arcade. Memorial Day-Labor Day; 9am-1am. Adults 50¢, children 20¢. Parking: weekdays $1, weekends $2.

OLDE TOWN MILL, Mill & Main Sts. Nation's oldest industrial power plant (1650), now a museum of Colonial manufacturing. June-Sept. 15: Tuesday-Sunday 1-4. Free. Nearby Nathan Hale Schoolhouse where patriot taught until 1775 is undergoing renovation.

SHAW MANSION, 11 Blinman St. Connecticut's naval office during Revolutionary War. Visited by Washington, Lafayette and others. Restoration includes unique panelled cement fireplace wall. Many Shaw family furnishings. Tuesday-Saturday 1-4. Closed major holidays. Adults 50¢, children 25¢. Tel: 443-1209.

U.S. COAST GUARD ACADEMY, Mohegan Ave. Campus open to visitors daily 9 to sunset. Guided weekend tours available by appt. Training bark "Eagle" may be boarded when in port. Dress reviews in fall and spring. Sunday evening band concerts in summer. Free. Tel: 443-8463.

New Milford

NEW MILFORD HISTORICAL SOCIETY, 4 Aspetuck Ave. Three-building complex on Town Green houses rare early portraits, miniatures, Indian artifacts. One house furnished in Victorian manner. Wednesday, Saturday 2-5. Free. Tel: 354-3069.

Niantic

ROCKY NECK STATE PARK, Route 156. Mile-long crescent beach is one of New England's finest. Camping, hiking, fishing, picnicking bathhouses, concessions. Parking $1.

Norfolk

HAYSTACK MOUNTAIN STATE PARK, Route 272 north, and DENNIS HILL STATE PARK, Route 272 south. Summit buildings afford magnificent views of surrounding Litchfield Hills. Dennis Hill particularly good during June laurel time.

Norwalk

LOCKWOOD-MATHEWS MANSION (1864), 295 West Ave. Sixty-room, $1.5 million blend of French, Scottish styling. Features include stenciled walls, inlaid woodwork, parquet floors, handcrafted fireplaces, great central rotunda with skylight. Tuesday, Thursday 11-2, Sunday 1-4. Closed Thanksgiving, Christmas, New Year's. Adults $1, children 50¢. Tel: 838-1434.

OLD MACDONALD'S FARM, 768 Connecticut Ave. (Route 1). Two-acre park has many tame animals, amusement rides, old-time general store, restaurant, shops. Geared for the young at heart. Apr. 15-Nov. 15: daily 11-6. Admission 99¢, rides 50¢. Tel: 866-5955.

Norwich

LEFFINGWELL INN (1675), 348 Washington St. Beautifully restored building, once a meeting place for patriots during Revolution, was private home of early industrialist Christopher Leffingwell. Summer: Tuesday-Saturday 10-12, 2-4, Sunday 2-4; winter: weekends only 2-4. Closed major holidays. Adults $1, children free with adults. Groups by appt. Tel: 889-9440.

MOHEGAN PARK & MEMORIAL ROSE GARDEN. Park has small zoo, many recreational facilities. Gardens in bloom May through October; particularly noted for roses in late June, early July.

NORWICHTOWN HISTORIC DISTRICT (East Town St., Elm Ave., Washington St.). More than 50 pre-1800 homes in Norwich Green area. Includes that of Samuel Huntington, president of Continental Congress, Governor of Connecticut, signer of Declaration of Independence. Huntington's grave is in nearby old Norwich Town Cemetery.

ROCKWELL HOUSE (1818) and BACKUS HOUSE (1750), 42 Rockwell St. Excellent period collections of furniture, clothing, glass, pewter, silver. July-August; Wednesday 2-5, other by appt. Tel: 887-8737.

ROYAL MOHEGAN BURIAL GROUNDS, Sachem St. Resting place of Uncas, Mohegan chief who gave original land for settlement of Norwich.

SLATER MEMORIAL MUSEUM, 108 Crescent St. (Norwich Free Academy). American art, furnishings; Indian artifacts; Oriental, African art; Egyptian, Greek, Roman artifacts. September-May: weekdays 9-4, weekends 2-5; June-August: Tuesday-Sunday 1-4. Closed major holidays. Free Tel: 887-2506.

Old Lyme

FLORENCE GRISWOLD HOUSE (1817), North Lyme St. Greek Revival mansion housed America's first art colony. Many paintings, 19th century antiques, rare china, toys, dolls. Mid-June to mid-September: Monday-Saturday 10-12, 1-5; Sunday 1-5. Adults 50¢, children 25¢. Tel: 434-7665.

LYME ART ASSOCIATION, Main St. Prestigious summer gallery offers three major shows each season in various media. Weekdays 10-5; Sunday, holidays 1-5. Adults 50¢. Tel: 434-7802.

NUT MUSEUM, Ferry Rd. Curator Elizabeth Tashjian's unusual and charming collection of nuts and nutwood products from all parts of the world displayed in a special section of her home. May-November: Wednesday, Saturday 2-5. Admission: one nut (any variety). Tel: 434-7636.

Old Saybrook

RIVERBOAT. Riverboat cruises along the Connecticut River and on Long Island Sound depart from Saybrook Point. (See also Essex, Haddam.) For schedules, rates: 345-4507.

Pomfret

WOLF DEN STATE PARK, Route 44 near junction of Routes 169, 101. Marked trail to woodland cave where young Israel Putnam, in 1742, slew the great wolf that had been preying on sheep herds in the area.

Redding

PUTNAM MEMORIAL STATE PARK, junction Routes 58 & 107. Winter encampment (1778-9) of Gen. Israel Putnam's army. Reconstructed log buildings, Revolutionary War museum; also facilities for fishing, hiking, picnicking. Park open all year. Museum: Memorial Day-Labor Day: 12-4. Free. Tel: 938-2285.

Ridgefield

ALDRICH MUSEUM OF CONTEMPORARY ART, 258 Main St. Important gallery of modern art has changing exhibits, outstanding sculpture court. Apr. 15-Dec. 15: weekends 2-5. Weekday (groups only) by appt. Adults $1, students 50¢. Tel: 438-4519.

KEELER TAVERN (1733), 132 Main St. Meticulously restored stagecoach inn. Furnishings largely original. Guides dressed in Colonial costume. Wednesday, weekends: 2-5. Closed major holidays. Adults $1, children 25¢. Tel: 438-5485.

Riverton

HITCHCOCK MUSEUM, Route 20. Extensive collection of rare 19th century Hitchcock furniture housed in old church meeting house. Nearby Hitchcock Factory maintains many "by hand" procedures, has showroom and gift shop. Museum hours: May-December: Tuesday-Saturday 10-5; December-May: Saturday 10-5. Free. Groups by appt. Tel: 379-1003 or 379-8531.

Rocky.Hill

DINOSAUR STATE PARK, West St. (I-91 exit 23). Hundreds of dinosaur tracks from Triassic Period (180-225 million years ago) displayed in domed building. Related exhibits. Visitors may make souvenir plaster cast of print. Guides available for groups. Apr. 1-Dec. 1: 10-5 daily. Free. Tel: 566-2304.

Sharon

GAY-HOYT HOUSE (1775), Main St. Home has uncommon brick construction, unusual interior details such as angle fireplaces in each room. June-October: Tuesday, Saturday 2-5. Donation. Tel: 364-5688.

SCAF GALLERY, Route 343. Excellent small museum of modern art has changing mixed media exhibits. On grounds of Sharon Playhouse, which offers repertory theater July-Labor Day. Summer: Tuesday-Sunday 2-5, also during performances. Free. Tel: 364-5909.

SHARON AUDUBON CENTER, Route 4. A 540-acre sanctuary with self-guiding trails, fine interpretive building. Tuesday-Saturday 9-5, Sunday 1-5. Closed major holidays. Adults $1, children 50¢. Tel: 364-5826.

Simsbury

MASSACOH PLANTATION, Route 10. Campus complex of historical buildings representing three centuries of life. Exhibits include Higley Coppers, first copper coins struck in America; the Tin Peddler's Cart; wooden machinery that produced America's first safety fuses. May-November: daily 1-4. Adults $1.25, children free. Groups by appt. Tel: 658-2500.

TALCOTT MOUNTAIN STATE PARK, off Route 185. Towering 165-foot building, once a home of Heublein family, may be reached by mile-long hike from parking area. Excellent view of countryside. Picnic, recreation areas. Building open Memorial Day-Columbus Day; grounds open all year. Free.

Somers

SOMERS MOUNTAIN INDIAN MUSEUM, Turnpike Rd. Interesting collections of Indian arts, crafts, costumes, artifacts. Daily 9:30-7 (Tuesday to 6). Closed Christmas. Free. Tel: 749-4129.

South Woodstock

QUASSET SCHOOL, off Route 169. Nation's oldest one-room school in point of continuous service (1748-1945). Museum of early American elementary education. On grounds of Woodstock Elementary School. June-November: Saturday 2-5. Donation. Tel: 928-9747.

Stamford

BARTLETT ARBORETUM, 151 Brookdale Rd. Sixty-two acre arboretum has complete variety of shrubs, trees. Self-guided tours free home landscape and gardening information. Grounds open all year 8:30-sunset; buildings 8:30-4:30. Buildings closed holidays. Free. Tel: 322-6971.

HOYT FARMHOUSE (Betsy Barnum House) (c. 1690), 713 Bedford St. Marvelous collections of period costumes, farm and carpentry tools, Revolutionary and Civil War artifacts. Tuesday-Friday 1-5. Donation. Tel: 323-1975.

STAMFORD MUSEUM & NATURE CENTER, Route 137 (Merritt Pkwy. exit 35 north). Museum displays include minerology, Indians, dinosaurs, firearms, other fields. Hecksher Farm for Children has variety of animals for feeding, petting. Stamford Zoo offers everything from waterfowl to bears. Also planetarium, observatory. Museum, farm, zoo: Monday-Saturday 9-5, Sunday 2-6. Planetarium: weekends at 4. Adults 50¢, children 25¢. Observatory: Friday 8-10 p.m. Parking: Connecticut cars 75¢, others $1.50. Tel: 322-1646.

Stonington

OLD STONINGTON LIGHTHOUSE (1823), The Point. Interesting displays of 18th, 19th century art, whaling and fishing gear, uniforms, swords, firearms, toys, and other relics. July-Labor Day: Tuesday-Sunday 11-4:30. Groups by appt.

Stratford

AMERICAN SHAKESPEARE THEATRE, 1850 Elm St. Modern building based on design of Globe Theater in Elizabethan London. Shakespeare repertory mid-May to Labor Day. Shakespeare costume exhibit. Madrigal singers entertain pre-performance picnickers. Tel: 378-7321.

JUDSON HOUSE & MUSEUM, 967 Academy Hill. 1723 home, faithfully restored and furnished. Good collection of farm and craft tools in cellar (once slave quarters). Modern museum at rear houses historic displays. April-November: Wednesdays, weekends 11-5. Closed Easter, July 4. Adults $1, children 50¢. Tel: 375-4183.

Suffield

HATHEWAY HOUSE (1760), Main St. Mansion and furnishings reflect distinct periods of 18th century taste. House wing (1795) has rare hand-blocked French wallpaper. One room signed and dated by creator. May 15-Oct. 15: daily 1-5. Adults $1, children 50¢. Tel: 247-8996.

KING HOUSE (1764), 234 South Main St. Early Americana includes collection of Bennington pottery, many carriages and wagons, tobacco room with cigar-making equipment. Special display of Revolutionary, Civil War artifacts. May-November: Wednesday 2-4. Adults $1, children free. Tel: 668-5256.

Terryville

LOCK MUSEUM OF AMERICA, 114 Main St. Unique historic collection of 12,000 locks and keys from 19th century. Most made in Terryville area, birthplace of lock industry. May-November: Tuesday-Sunday 1:30-4:30. Other by appt. Free. Tel: 589-9797.

Tolland

BENTON HOMESTEAD (c. 1720), Metcalf Rd. Center-chimney Colonial housed Hessian prisoners during Revolutionary War. Interesting architectural detail, original panelling, authentic furnishings. A celebrated "ghost" house. May-October: Monday, Wednesday 1-4. Free.

Uncasville

TANTAQUIDGEON INDIAN MUSEUM, Route 32. Museum and grounds are filled with Connecticut Indian life and lore. Authentic wigwam, longhouse, stockade. May-November: daily 10-6. Donation. Tel: 848-9145.

Wallingford

SAMUEL PARSONS HOUSE (1759), 180 South Main St. Charming gambrel-roofed house, once a stagecoach tavern. Collections of 18th and 19th century furnishings, china, farm tools, firearms. Sunday 2-5, other by appt. Free. Tel: 269-6257.

Warehouse Point

CONNECTICUT ELECTRIC RAILWAY TROLLEY MUSEUM, Route 140, (I-91, Bridge St. Exit). More than 30 refurbished trolleys dating from 1892 carry passengers on three-mile ride. Other equipment on display. All year: weekends, holidays 1-5; summer: Tuesday-Friday 11-4. Museum free. Rides: adults $1, children 50¢. Group rates. Tel: 623-7417.

Waterbury

MATTATUCK MUSEUM, 119 West Main St. Collections of local history, fine arts. Five meticulously recreated rooms (four Colonial, one Victorian). Displays include Connecticut Artists Collection. Tuesday-Saturday 12-5, Sunday 2-5. Free. Tel: 754-5500.

MINIATURE HOLY LAND (Pine Hill). Scores of miniature buildings representing Biblical Bethlehem and Jerusalem cover acres of central hillside. Towering silver cross at crest of hill can be seen for miles. Open all year. Donation.

Waterford

EUGENE O'NEILL MEMORIAL THEATER CENTER, Route 213. Tribute to New London-born playwright. Highlights are National Playwrights Conference and Critics Institute, July and August, National Theater for the Deaf, and National Theater Institute. Open daily in season. Closed major holidays. Tel: 443-5378.

HARKNESS MEMORIAL STATE PARK, Route 213. Italian-style villa, once a private home, has collection of Rex Brasher bird paintings. Beautiful formal gardens, shaded lawn picnic areas, fine beach for combing, fishing (no swimming). Grounds open all year. Mansion open Memorial Day-Labor Day: weekdays 10-5; weekends, holidays 10-6. Admission: 50¢ when mansion is open.

West Cornwall

COVERED BRIDGE, Route 128. Designed by Ithiel Town, in continuous service since 1837. One of the most photographed structures of its kind in New England.

West Hartford

CHILDREN'S MUSEUM OF HARTFORD/ ENVIRONMENTAL CENTERS INC., 950 Trout Brook Dr. Exhibits on Indian, Colonial, Far Eastern cultures, wildlife, natural history. Marine aquarium, live animals, planetarium. Monday-Friday 2:30-5, Saturday 10-5, Sunday 1-5. Closed major holidays, month of September. Museum free. Planetarium, aquarium: adults $1.50, children 75¢. Groups by appt. Tel: 236-2961.

NOAH WEBSTER HOUSE & MUSEUM (c. 1700), 227 South Main St. Birthplace of man who wrote "Blue-Backed Speller" (1783) and "American Dictionary" (1828). Simple frame dwelling now contains Webster memorabilia. Guides dressed in colonial costume. Thursday 10-4, Sunday 2-4, other by appt. Adults $1, children 25¢. Tel: 521-1939.

Westport

NATURE CENTER FOR ENVIRONMENTAL ACTIVITIES, 10 Woodside Lane. Includes a youth museum, environmental action resource center, natural areas trust, environmental studies resources, 55-acre sanctuary with many trails through a variety of terrain. Monday-Saturday 9-5, Sunday 2-5. Free. Tel: 227-7253.

SHERWOOD ISLAND STATE PARK, I-95, exit 18. Lovely 1½-mile beach for recreation. Two large picnic groves near the water. Full facilities for swimming, fishing. Concessions. Parking: $1.

Wethersfield

BUTTOLPH-WILLIAMS HOUSE (c. 1690), Broad St. Beautifully restored garrison colonial, excellent period furnishings. Kitchen said to be the best of its period in New England. National Historic Landmark. May 15-Oct. 15: daily 1-5. Adults 50¢, children 25¢. Tel: 247-8996.

JOSEPH WEBB HOUSE (1752), Main St. Outstanding example of Colonial architecture. Site of historic strategy conference (1781) between Washington and Rochambeau. Fine furniture, fabrics, silver, porcelain. National Historic Landmark. Tuesday-Saturday 10-4; May 15-Oct. 15: also Sunday 1-4. Adults $1, special group, children's rates. Tel: 529-0612.

ISAAC STEVENS HOUSE (1788), Main St. Fine hand-wrought fixtures, period furnishings. Special exhibits of old toys and ladies' bonnets. Good backdoor herb garden. Hours, rates, phone: see Webb House.

SILAS DEANE HOUSE (1766), Main St. Built by member of First Continental Congress and Commissioner to France. Unique structural details, elegant furnishings. National Historic Landmark. Hours, rates, phone: see Webb House.

Willington

WILLINGTON WILD ANIMAL FARM, Old Farms Rd. Connecticut's largest wildlife farm, dedicated to the preservation of endangered species. Many rare and unusual animals. Daily 10-dusk. Adults $1.35, children 75¢. Tel: 429-2424.

Wilton

WILTON HERITAGE MUSEUM (c. 1731), 249 Danbury Rd. Distinguished Colonial home has local family furnishings, fixtures of 18th, 19th centuries. Gallery with changing exhibits in rear ell. Weekends 2-5. Closed in August. Donation: adults $1, children 25¢. Tel: 762-0101.

Windsor

FYLER HOUSE (c. 1640), 96 Palisado Ave. One of oldest surviving frame houses in Connecticut, carefully restored, filled with period furniture and artifacts. Adjoining Wilson Museum contains rare historical and genealogical materials. April-December: Tuesday-Saturday 10-12, 1-4. Closed major holidays. Adults 50¢, children 15¢. Tel: 688-3813.

OLIVER ELLSWORTH HOMESTEAD (1740), 778 Palisado Ave. Elegant home of a member of the Continental Congress, framer of Constitution, U.S. Senator, U.S. Chief Justice, Minister to France. House contains Gobelin tapestry presented to Ellsworth by Napoleon. May-November: Tuesday-Saturday 1-6. Donation. Tel: 688-9444.

Windsor Locks

BRADLEY AIR MUSEUM, Route 75 at Bradley International Airport. Exceptional collection of vintage aircraft—World War II to early jets. Some of history's most famous planes. All year: weekends, holidays 10-6; June-October: daily 10-6. Closed Christmas, in inclement weather. Adults $1, children 50¢. Tel: 223-8803.

Woodbury

FLANDERS NATURE CENTER, Church Hill Rd. Extensive 830-acre sanctuary with many trails, good environmental center with special displays. Tuesday, Thursday, Saturday 9-5; Sunday 1-5. Free. Tel: 263-3711.

GLEBE HOUSE (1740), Hollow Rd. Birthplace of American Episcopacy. Site of Samuel Seabury's election as first bishop of Episcopal Church in America. First floor an authentically restored home; second floor a church museum. Summer: Wednesday-Saturday 11-5, Sunday 1-5 (4 in winter). Free. Tel: 263-2855.

Woodstock

ROSELAND (1845), Route 169. Pink Gothic Revival mansion built as summer cottage (its owner *loved* roses). Considered to be among the finest of its style in New England. Many original furnishings. June-November: Tuesday, Thursday, Saturday 1-5. Connecticut residents $1, others $2.

For free Connecticut vacation information on places to stay, things to see and do, camping, golfing, salt water fishing, and special events, write to:

CONNECTICUT DEPARTMENT OF COMMERCE

210 Washington St., Hartford, CT 06106
Edward J. Stockton, Commissioner

In New York City, visit the Connecticut Vacation Center, 1268 Avenue of the Americas. Telephone (212) 757-4455.

GUIDE SHEET #10

USE VALUE LAND ASSESSMENT IN CONNECTICUT

By Irving F. Fellows
Professor of Agricultural Economics
The University of Connecticut

Q. *What is the basic purpose of Public Act 490 concerning the taxation of land?*

A. This Act is one of several steps taken by the state government to protect the environment in Connecticut. Its main purpose is to help bring a higher quality of life to all residents of the State.

Q. *How will the Act improve the environment?*

A. By maintaining areas of open space between urban centers and throughout the countryside, the Act encourages the visual separation of communities, protects public water supply areas, enhances air quality, provides recycling areas for waste disposal, and provides the basis for many types of outdoor recreation. These contributions improve the environment for all people in the state.

Q. *What technique is used to accomplish these objectives?*

A. Tax assessment procedures for land which qualifies under Public Act 490 are based upon "use" value rather than "market" value.

COOPERATIVE EXTENSION SERVICE
COLLEGE OF AGRICULTURE AND NATURAL RESOURCES
THE UNIVERSITY OF CONNECTICUT, STORRS

Q. *What is the distinction between these two assessment methods?*

A. Under use value assessment, the tax base value of land is related to its potential earning capacity when used in broad land use classes which have been established historically by Connecticut assessors. Under market value assessment, the tax base value of land is related to the potential sales value based upon "comparable sales" in a fair market transaction in the town or adjacent towns.

Q. *Can the two tax base values be greatly different?*

A. In a truly rural area, the difference will be small, but, in an area of rapid urbanization, the market value method can give tax base values many times greater than the use value method. In many Connecticut towns, the rapid population growth has led to a substantial difference between the two methods.

Q. *Is it not true that many people believe the market value method results in "highest and best use"?*

A. For many years, our society has believed in the ability of the "market" to best allocate resources. When this concept is applied to land, some believed the "best" use would result. We are discovering several fallacies in the procedure. The most important is the failure of the "market" to consider the social welfare problem. Private goals do not necessarily correlate well with public goals. Many of our current environmental problems stem from this divergence. Therefore, a market value assessment base could and, historically, often has encouraged destruction of the environment. On the other hand, the use value assessment base can direct resources into uses favorable to environmental protection.

Other weaknesses give questionable results. The difficulty of deriving comparable land sales data is great. Each case is unique, for land has location and quality differences which cannot be duplicated. Demand may also be limited and unique. For example, the sale of land for intensive development should not imply that all open land in the town can be sold at comparable prices for similar uses.

Q. *Then use value assessment may actually result in the "best" land use?*

A. From a social standpoint, absolutely. As society becomes more conscious of the need to protect the environment, the market system should not be relied upon exclusively to make crucial decisions on resource use. In the public interest, we are already taking many restrictive steps and passing many laws which regulate the production process on farms and in industries. Also, in the public interest, use value assessment is one of the valuable tools which can be used to encourage land use which is consistent with an improved environment in the State.

Q. *Do owners of land which has been assessed on a use value base pay lower taxes than they had been paying?*

A. Generally, no. In most rural areas, use value assessments usually result in a tax as large as in previous periods, before urbanization encouraged market values related to intensive uses. However, in areas adjacent to highly urbanized areas, use value assessments have resulted in lower property taxes for qualifying land.

Q. *Why are the areas around urban centers affected more than rural areas?*

A. Demands for land for industrial, residential and similar intensive uses bid up the price of adjacent land. When market value assessment techniques are used, the tax base for all nearby open land is raised far above a base compatible with profitable use in agriculture and open space. The land owner is forced to sell to escape financial losses and the public loses the environmental benefits of low intensity land use around urban areas.

Q. *Has the tax base for land been raised in rural areas?*

A. Each town is required to reevaluate taxable property at least every ten years. Many rural towns reevaluated land in the late 1960's and early 1970's. Application of the market value method resulted in large increases in the tax base per acre. At the new tax base, many owners of rural land could not profitably utilize this land for low intensity use. Had it not been for qualification under P.A. 490, thousands of acres of rural land would have been forced onto the market, and the environment would have deteriorated for all people.

Q. *Does P.A. 490 give a special tax privilege to a specific group?*

A. Not in the usual sense. Any person or group which owns land and meets specific qualifications is eligible for the use value assessment method.

Q. *How does a land owner obtain use value assessment under P.A. 490?*

A. A land owner must make an annual application to the local tax assessor within 30 days of the local assessment date and must meet specific qualifications.

Q. *What specific qualifications must be met?*

A. The main aspects of three methods of qualification are as follows:

1. Farm land. All land associated with farming operations can qualify. Certain criteria, such as income, expenses, and existence of production buildings and equipment may be considered by the assessor.
2. Forest land. Any forest area of 25 or more acres which has been inspected and certified by a State forester can qualify.
3. Open space. Any area which may be a part or whole of an area designated by a local planning agency and the town as desirable for open space can qualify.

Other details apply in specific cases. The land owner should investigate all regulations.

Q. *Who determines use value rates for qualifying land?*

A. The local assessor is the only person who can assess property in a town and apply use value rates. Because use value rates reflect the earning potential of land in specific classes, a group of technically qualified people has studied the problem and has made recommendations to the assessors. Accuracy, consistency, and simplicity were guide lines used in these recommendations. The procedure adopted was the capitalization of annual net rents or, when there was insufficient rental data, the capitalization of net value of annual output. Capitalization of net values is a widely accepted assessment method.

Q. *What were the recommended use values assessment rates for different classes of land?*

A. The recommended use value rates for major classes of land were as follows:

Tillable A (shade tobacco & nursery)	$500.00 per acre
Tillable B (binder tobacco, vegetable crops and potatoes)	250.00 per acre
Tillable C (other cropland & cropland pasture)	125.00 per acre
Orchard	200.00 per acre
Untillable (permanent pasture)	50.00 per acre
Woodland & Sprout	25.00 per acre
Swamp & Waste	10.00 per acre

Q. *Has P.A. 490 been able to accomplish its objectives?*

A. It is too early to have a definite answer to this question, because, until reevaluation, many land owners did not need to place land under the Act. In the more urbanized areas, persons concerned with the administration of the Act have indicated that it has delayed many sales of open space lands.

Q. *Have problems arisen in connection with P.A. 490?*

A. Many persons familiar with the Act believed that speculators could take advantage of use value assessments by holding land temporarily under its provisions and then selling for intensive development. This weakness existed and, to correct it, Public Act 152 was passed in 1972 establishing a conveyance tax on land which had been placed under P.A. 490. The conveyance tax applies to qualifying farm, forest, or open space land if it is sold within a period of 10 years after initial acquisition or qualification, whichever is earlier. The schedule of rates applicable to the total sale price is shown below:

10% if sold within the first year of ownership
9% if sold within the second year of ownership
8% if sold within the third year of ownership
7% if sold within the fourth year of ownership
6% if sold within the fifth year of ownership
5% if sold within the sixth year of ownership
4% if sold within the seventh year of ownership
3% if sold within the eighth year of ownership
2% if sold within the ninth year of ownership
1% if sold within the tenth year of ownership

Q. *Why was a conveyance tax established rather than a "recapture clause" as is done by some other states?*

A. The conveyance tax eliminates the keeping of two sets of values on every piece of property qualified under P.A. 490. Only those few properties which are sold during the tax year are subject to the conveyance tax. Because it must be paid locally before a deed transfer is recorded, the tax is easy to administer. Also the high initial rate is a substantially greater penalty than is the recapture of differences in taxes between use value and market value assessments.

Q. *Have other problems shown up?*

A. Problems of definition have arisen. Many have been settled by court cases which have established precedent. Another problem has been the failure of local planning or conservation groups to identify areas of desirable open space and thereby permitting land owners in these areas to have use value assessment. This aspect of the Act should be used to reap the full potential of environmental benefits for society.

Q. ***Will P.A. 490 solve our environmental problems?***

A. It has been and will be of great benefit. But one danger is to consider it *the answer* to improvement of the environment. It is *only one device* which can be used and it can be successful over a long time period only if it is combined with other tools to protect and enhance the environment and quality of life in Connecticut.

Q. *Where can a land owner obtain more information about P.A. 490 and P.A. 152?*

A. There are many sources for official information. The State Tax Commission and the Department of Agriculture and Natural Resources in Hartford can provide copies of the Acts. More detailed discussion of the Acts can be obtained from the Cooperative Extension Service of the College of Agriculture and Natural Resources at Storrs. At the County Extension offices, agents can provide information. Write, visit, or phone your local agent for assistance.

The Connecticut Cooperative Extension Service educational programs at all levels, neighborhood, community, town, county, area and state, are provided on a non-discriminatory basis and as such are open to all without regard to race, color, age, national origin, sex or religion.

Connecticut Cooperative Extension Service, E. J. Kersting, Director, Storrs, Conn. Issued in furtherance of the Acts of Congress of May 8 and June 30, 1914. (SEPTEMBER 1972, UP, 3M)

GUIDE SHEET #11

PUBLIC AND PRIVATE AGENCIES INVOLVED IN THE AQUISITION AND PRESERVATION OF OPEN SPACE

FEDERAL

Bureau of Outdoor Recreation
U.S. Department of the Interior
600 Arch St.
Philadelphia, PA 19106

-administer the Land and Conservation fund whose grants cover aquisition and development on a 50/50 basis.

U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

-this agency can aquire limited rights for flood control purposes.

U.S. Department of Agriculture
Soil Conservation Service
Mansfield Professional Park
Route 44A
Storrs, CT 06268

-small watershed program

U.S. Department Housing and Urban Development
451 7th St. S.W.
Washington, D.C. 20410

-Open Space Program provides 50/50 match for aquisition but not development. Emphasis is placed on lands that provide recreational and visual relief in high density areas.

PRIVATE

Connecticut Audubon Society
2325 Burr St.
Fairfield, CT 06430

-To further the conservation of wild birds, mammals, and other wildlife and fostering education in natural history.

Connecticut Forest and Park Assoc.
1010 Main St.
P.O. Box 389
Hartford, CT 06108

-A voluntary organization for conserving forests, scenery, wildlife, and developing natural resources and outdoor recreation.

Nature Conservancy
Connecticut Chapter
P.O. Box-MMM Wesleyan Station
Middletown, CT 06457

-The statewide chapter of an organization with an active program to acquire and manage natural areas for scientific, educational and environmental uses.

STATE

Department of Environmental Protection
State Office Building
Hartford, CT 06115

State parks
State forests

Local Land Trust

Planning and Zoning Commission

Local Conservation Commission

Park or Recreation Department

Historical Society

Public Utilities - local utilities

water companies
electric utility companies

Private organizations such as country clubs, schools, summer camps, Boy and Girl Scouts, 4H, YMCA, and sports clubs.

GUIDE SHEET #12

ANNOTATED SUMMARY OF LAND PROTECTION METHODS*

I. Regulation to Protect Open Space

Regulation is defined as uncompensated control of activities for the public health, safety, morals, and welfare. The state has broad powers to regulate human use of the land and its resources. The state could excercise either its zoning powers which in the past have been delegated to the local level or it could excercise its power of eminent domain.

A. Police power

1. Banning nuisances - mostly health ordinances

2. Building Codes - housing size, set back requirements, building lot size

3. Zoning Requirements
   Zoning is the major police power employed to control land use. It classifies and segregates land according to permitted uses. For further details on zoning see the local implementation A-T unit. The many kinds of zoning are listed below:

   large lot zoning
   shoreline zoning
   floodplain zoning
   open space zoning
   historic district zoning
   aesthetic zoning
   agricultural zoning

4. Subdivision Controls
   One form of subdivision control is the cluster development concept. Cluster development is the old New England village brought up to date. A cluster development keeps the residential density the same as the zoning requires but plans on a site basis rather than a lot basis in order to preserve a natural setting and maintain open space. In addition to other benefits of cluster development, land is preserved in open space. See the Local Implementation A-T unit for further details.

5. Critical Area Legislation - legislation to protect critical land areas such as inland wetland, coastal wetland, or prime agricultural land.
   See Coastal Wetlands A-T unit. Uplands A-T Unit or Inland Wetlands A-T units for details.

B. Taxation

1. Preferential taxation for open space land such as P.A. 490. Use value assessment. See guide sneet # 8.

2. Extractive taxes - taxes on minerals removed from land generally used to discourage mining or finance land reclamation.

3. Preferential taxes to encourage forestry. 1913 Forest tax law gave private forest land owners tax abatement and delayed tax on timber until cut.

4. Tax penalties for contruction in areas where protection is desired.

C. Control of Developers

1. State and Federal Environmental Quality Acts covering water quality, air quality, or solid waste often set criteria for land use decisions which might affect the air or water quality in the area.

2. Consumer legislation directed at land sales.

3. Sewer and Construction Moratoriums
   In some areas growth has been so rapid that new development has outstripped the capacity of sewage treatment plants or is so haphazard that some communities have passed local ordinances to prevent further construction or new hookups to the sewer line until the community has developed an orderly development plan.

II. Aquisition of Interests in Land

A. Fee (permanent) - In the past, the major method of acquiring and/or preserving land for open space use has been by gift or purchase of fee interest (full title) by a public or private body.

1. Purchase: full rights to the property are purchased. Purchase allows unrestricted use but has the disadvantage of large capital costs and large maintanence costs.

GUIDE SHEET #12
(CONTINUED)

2. Gift: a citizen(s) donates their land to public or private agency.

B. Fee (variable term) -

1. Leases: Leases permit one party to use the land of another for a set period of time. A fee is paid for the lease. There is no guarantee of permanence: if and when the lessor discovers a new and profitable use for his land he may withdraw or terminate the lease. Leases are useful in the short term, but have no guarantee of permanence.

2. Licences: Licences provide revocable permission to come on land and use if for specified purpose. A license to use land can be for hunting, or some other recreational activity, but because it is revocable, the license provides no long range protection of the land at all.

C. Less than fee

1. Incorporeal interests

(a) Covenants running with the land: a fee owner may promise (covenant) not to use land for certain purposes. There are many technical problems with this method. Restrictive covenants need careful legal work to withstand test of time.

(b) Easements: An easement permits two or more parties to simultaneously and perpetually hold separate interests and rights in the same parcel of land. Easements are widely used by the public utilities and are also commonly found in agreements for rights of way.

i. Trespass Easements - The basic use of these easements is to permit trespass across, or on property for specified purposes such as to fish from a privately open bank, to hike or ride a horse across lands owned by others, or to launch boats.

ii. Development Easements - Development easements involve an agreement by the private owner to limit his development of his land. Often this involves only looking at the land as a scenic easement.

The following is a list of the major easements which may be either trespass or development easement or a combination of the two:

- Hunting and Fishing Easements
- Flowage Easement (permit flooding of land)
- Wetlands Easements
- Conservation Easements (see pamphlet - Land - the Most Enduring Gift)
- Trail Easement
- Scenic Easement
- Historic Preservation Easement

(c) Advantages of Easements

i. to acquiring organization
-cost-should be difference between fair market value of land with the easement and without it
-easement may be donated
-land remains on local tax roles
-no maintenance cost
-land remains productive and "alive"

ii. to the landowner
-retention of title and remaining control of land
-preservation of present land state
-tax protection

2. Dividing the fee - The purchase of fee simple rights in land includes a number of rights to the owner. Among other rights these include the right to: see, trade, will, mortgage, lease, rent, subdivide, enter contractural arrangements, grant easements, subsurface minerals, air space above land, develop, timber, exploit within reason etc. Often a landowner will see one of these rights for a fee. The rights most often subject to this practice are:

- Mineral rights
- Timber rights
- Water rights
- Air rights
- Development rights

* Sources: Open Space: Alternative Legal Methods of Preservation - Central Naugatuck Valley Regional Planning Agency, 1967.

Private Approaches to the Preservation of Open Land by Russell L. Brenneman Conservation and Research Foundation, 1967.

GUIDE SHEET #13

Priorities
in
Open Space
Planning
and
Acquisition

COOPERATIVE EXTENSION SERVICE, COLLEGE OF AGRICULTURE AND NATURAL RESOURCES
THE UNIVERSITY OF CONNECTICUT, STORRS, CONNECTICUT

Priorities in Open Space Planning and Acquisition

By Edgar P. Wyman, *Extension Forester and*
Miklos J. Gratzer, *Assistant Professor of Forest Recreation*

Americans have been wearing and tearing their environment with persistent energy for three and a half centuries, but the results were not apparent to most of our population until quite recently. By then the separate problems of waste of raw materials, noise, crowding, destruction of natural beauty, loss of human individuality, and the pollution of air, soil, and water had combined into the one complex mess which threatens to destroy the liveability of our continent.

Many people are now eager to do something about these problems, and much has been accomplished. Many attempts have also failed, and the problems continue to grow faster than solutions can be developed. Many of these unsuccessful efforts were made by good citizens anxious to protect their own environment. Usually they were reasonably well informed, had funds available, and were loaded with energy. In spite of this they failed. Very often they failed because they did not appreciate the necessity for educating and informing the public and developing strong public opinion on their side. More important, perhaps, they underestimated the strength of their opposition; the entrenched industries, the political structures, the complacent citizens.

This pamphlet is prepared to suggest ways in which concerned citizens may organize to combat these threats to our surroundings without repeating the more obvious errors of the past. It borrows from the experience of those who tried and failed, and from those who tried and succeeded. It makes no pretence toward answering all the questions or solving all the problems, but we hope it will give a good push in the right direction.

land owners and managers as expressed through their own trade organizations and publications. We all reflect our own biased views, and conservationists are no more free from bias than are lumbermen.

Organizations such as the American Forestry Association and the Connecticut Forest and Park Association try to publish fair and factual analyses of conservation problems. There are scores of books published yearly on the topics of your concern. Haunt your library, read reviews in the papers, and organize discussion groups with individuals assigned to read, digest, and report on books that all do not have time to read. Get on the mailing lists of the U. S. Department of Agriculture and the U. S. Department of the Interior.

Familiarize yourself with local, state, and federal laws and regulations which affect your program. Make certain that your political representatives on every level keep you informed on what is brewing in the Congress and in the state legislature. Also, be sure to let them know what you think along these lines. Remember, more and more federal monies are available for state and local conservation projects, so national conservation legislation may be vital to your local program.

Look around you. Where a job has been well done in another town hunt up the individuals responsible and learn how they did it. Take advantage of their experience. Avoid their errors and capitalize on their successes.

When it comes right down to doing the job, remember Gideon's army. A small well-organized group of informed, dedicated individuals can accomplish far more than a multitude of ill-informed, loosely organized enthusiasts. One or two persons who prepare a program thoroughly and use all available public information and assistance may accomplish miracles.

Learn everything possible about the specific problem and area. In developing an open-space program the first commandment is "Know Thy Town!" Study all available maps. Talk with S.C.S. personnel and study their land-use maps and aerial photos. Find out who owns the land in town, especially the larger undeveloped areas where there may be natural features worthy of preservation. Read up on town history; there may be clues to historical sites and traditions which will appeal to the public imagination and influence public thinking if properly presented.

Make a biological inventory. This means an inventory of all the natural features in the town; unique topography, soil types, drainage, bodies of water, animal habitat. Here you can use special help. The local representative of the Park and Forest Commission, the Game Warden or Game Biologist, the S.C.S. engineer, the president of the local bird club all have special knowledge and skills, and most will be pleased to be asked to help, especially in their specialty.

The Selectmen or Town Clerk, members of local service clubs, Scoutmasters, Town Medical Officer, Fire Chief, etc., are people who can provide socio-economic data. They know where the people live, where the social and economic problems in town are

One of the clearest signs of change is the rapid disappearance of the wide open spaces which used to characterize our landscape. In Connecticut topography and forests combine to allow us more privacy in our homes than we might find in a flat and treeless land. But many a community is discovering that there just are no more large areas within their boundaries where people may hunt or fish, walk or ride horseback, or even eat a quiet picnic lunch. The preservation of open space is suddenly of vital concern to people who, until very recently, never gave the matter serious thought.

No longer can one climb the stone wall and wander at will over his neighbor's farm; it's probably a shopping center. And the next farm down the road is in line for development. Individuals cannot be expected to pay taxes and maintain open space land for public use. If there is to be such space in the future in many Connecticut towns, it must be maintained by the public. We say "maintained" because it is not always necessary to acquire fee simple title in order to preserve open space. In fact, it can sometimes be done with less cost and difficulty in one or more of several other ways.

In his book THE LAST LANDSCAPE William H. Whyte writes of a number of approaches to public preservation of open space. Whyte describes various zoning programs designed with this purpose in mind, gives several specific examples, and tells how and why they were successful or failed. He discusses acquisition of fee simple title and the legislative and legal perils and pitfalls involved therein. Whyte goes into considerable detail in describing the use of easements, land trusts, and special tax laws to protect open spaces for long-term public benefit. He also devotes a chapter to methods of defending established open space areas against intrusion by highway planners and other local, state, and federal agencies which would take over such lands for their own purposes. Whyte's book should be required reading in the earliest stages of open space planning.

What we have to say in this pamphlet refers specifically to public preservation of open space. It may be applied equally well to other conservation problems.

To begin with, do not assume that enthusiasm and concern automatically mean understanding and accomplishment. When you start out to move the world of public opinion you need not only the lever of enthusiasm, but a place to stand upon. This is built on facts. They must be ably and widely presented, not just once, but again, and again, and again.

Preparation for a campaign of public education means first a campaign of self education. In preparing for a specific project you must be well informed in the broad field of land use. Read the daily papers, especially the editorials and the letters to the editor. These tell you what people think about, and what they think about it. Certain papers are known for their special interest in conservation issues. Read them, but don't forget to read opposition views, too. Read mailings from conservation organizations, but don't forget the views of forest located, who works where, what farms are paying their way and what farms are not. They know where the new schools will have to go when the time comes, and where the business and industrial growth must take place. These are data which point to potential problems in land utilization within the town.

This means planning land use, or even Planning and Zoning. There is little point in open space programs unless they are designed with an eye to the future, and without Planning and Zoning how far into the future can the eye see? Problems of land and water use often cross political boundaries, and occasionally regional planning agencies and programs may be involved.

It will be easier to persuade the public to set aside open space land if another group or agency is not bidding for that same land for another use. This means listing all foreseeable uses of important tracts and determining priorities. Concentrate on those where the combination of public benefit and best use for that site add up to open space or recreation. This means public benefit in specific terms of time, too, not in some indefinite future. People will be interested in an area which they or their children may *use*. Beneficiaries of such programs will be the best supporters.

The findings of your committee must be made public knowledge as soon as they can be properly presented, and well before public action can be called for. Write-ups should be clear, concise, and interesting! Use imagination and enthusiasm, but be sure to include hard-rock facts. Emphasize that early action and use of all possible public assistance funds usually mean a real bargain. Well-planned slide talks for presentation to groups should be brief and to the point. News stories should have news value. Posters and displays should be of high quality and with artistic merit; if they do not attract the eye they will not reach the mind. The poster that dominates your living room is swallowed up in the community; make enough sets to saturate the target area when your educational campaign starts. Be prepared to speak to every group in town. Almost every program chairman has problems. If you can offer an interesting and timely program, you'll have a chance to deliver it.

When you get right down to "who will do the job?" there are two basic choices; either an existing organization or agency, or a new one created specifically for this purpose. It may be that there is already a local group such as a service club or conservation organization within whose sphere of interest the project lies. In that case the job may be handed over to a regular or special committee. The really important point is not what organization it is, but who are the committee members who will do the work.

If there is no existing organization, one may be formed. The local Community Resource Development Agent of the Cooperative Extension Service may help. Pick out prominent, effective local people, but only if they are really sold on what they are to do, and are willing to *work* at it. "Token" members or figureheads serve an important function later, but workers do the job! If you can get representatives of the local press, radio-T.V. circles actively interested that's fine. If you use political figures, keep them balanced. For open space or any other conservation project to become a political issue can be the "kiss of death." If it already is a political issue, try political ecumenicism.

People won't get excited about an issue they know nothing about. Plan news stories and radio-T.V. coverage of the area as soon and as early as possible. "Soften up" the public by developing general interest in what is going on, who is using the area, what are the potentials.

When you have something you can talk about with enthusiasm and accuracy, "talk it up," hold small public or private meetings, tailor the program to the public point-of-view, search out the easiest attack points. Don't be afraid to seek new ideas at these meetings. Sometimes fresh points-of-view which simplify very difficult questions and problems spring from such virgin soil. But don't "try on" new ideas too publicly. Try to shake out the "bugs" and questions as thoroughly as possible before starting to persuade the public. Avoid the necessity of issuing "revised" proposals. These almost always discourage public enthusiasm.

Then select the plan which appears to have the best chance of enthusiastic public acceptance, state it as clearly and briefly as possible, and go out and saturate the community with your campaign.

Now is the time for endorsement by those public figures whose names have public relations value, but who may not be willing to actually work on the project. By making issues as nonpartisan as possible you may enroll a broad spectrum of individuals and organizations in support of your plan, but don't dilute your ideas for this purpose so that they are no longer useful. It is better to fight for a good plan than to gain easy acceptance of a poor one. Get evidence of public support; send boys and girls out with petitions to be signed; visit organizational meetings and make your "pitch" with a petition in hand; prepare simple, direct resolutions which local organizations can support and get members of standing to introduce them. Launch a program of letters to the local and regional press; get on the local "Speak Out" radio-T.V. programs; try to get local political leaders of both parties to give support. *Then*, and not before, go for the decision!

A poorly prepared, sloppily presented campaign will almost certainly result in a lost referendum or a defeat in town meeting. A well-organized, well-prepared and presented campaign provides favorable odds for success. It is important that open spaces and recreation areas be set aside before bidding for alternative uses becomes too high. If you try and fail you will have drawn attention to values which might otherwise have gone unrecognized a little longer, and the properties may not be there waiting for a second try. Do it right the first time!

RECOMMENDED SOURCES OF INFORMATION

Publications:

Connecticut Comprehensive Statewide Outdoor Recreation Plan 1965 – 1970, Report by Vollmer Associates, Engineers and Landscape Architects, Dept. of Agricultural and Natural Resources, State Office Building, Hartford, Conn. 06115.

The Green Land, Connecticut Interregional Planning Program, 1966. Interregional Planning Commission, Dept. of Agriculture and Natural Resources, State Office Building, Hartford, Conn. 06115.

Index of Open Space Studies, Connecticut Interregional Planning Program, Technical Report 341, 1967, Interregional Planning Commission, Dept. of Agriculture and Natural Resources, State Office Building, Hartford, Conn. 06115.

A Directory of Private Organizations Providing Assistance in Outdoor Recreation to Individuals, Organizations, Public Groups, Dept. of Interior, Bureau of Outdoor Recreation, Washington, D. C. (available from Govt. Printing Office, Supt. of Documents, Washington, D. C. 20402).

Federal Assistance in Outdoor Recreation Available to: States, Their Subdivisions, Organizations, Individuals, Dept. of Interior, Bureau of Outdoor Recreation, Washington, D. C., Pub. No. 1 (available from Govt. Printing Office).

Preserving Open Space in Expanding Areas, Northeast Regional Resource Economics Committee Report No. 2, Papers presented at a Seminar arranged by the Urban-Impact Subcommittee of the Northeast Regional Resource Economics Committee, New York, New York, June 8 and 9, 1967. (available from Massachusetts Agricultural Experiment Station, University of Massachusetts, Amherst).

Soil, Water and Suburbia, U. S. Dept. of Agriculture, U. S. Dept. of Housing and Urban Development, March 1968 (available from Govt. Printing Office).

Enabling Legislation, Public Acts of the 1965 Session of the Connecticut General Assembly, Open Space Land Acquisition Recreation Authority, Dept. of Agriculture and Natural Resources, State Office Building, Hartford, Conn. 06115.

Recreation Land Price Escalation, Dept. of Interior, Bureau of Outdoor Recreation, Washington, D. C. 20240 (available from Govt. Printing Office).

Land and Water for Tomorrow, Training Community Leaders: A Handbook (available from the League of Women Voters Education Fund, 1200-17th Street, N. W. Washington, D. C. 20036).

Federal Outdoor Recreation Programs, Dept. of Interior, Bureau of Outdoor Recreation, July 1968 (available from Govt. Printing Office).

A Proposed Program for Roads and Parkways, U. S. Dept. of Commerce (available from Govt. Printing Office).

From Sea to Shining Sea, A Report on the American Environment–Our Natural Heritage, The President's Council on Recreation and Natural Beauty, Washington, D. C. 1968.

The Last Landscape, by William H. Whyte, Doubleday & Company, 1968.

Connecticut Woodlands, bi-monthly publication of the Connecticut Forest & Park Association, East Hartford, Conn.

Guidelines for Town Conservation Commissions, Cooperative Extension Service, The University of Connecticut, Storrs, Conn. 06268.

A Directory of Agencies Concerned with Connecticut's Natural Resources, Cooperative Extension Service, The University of Connecticut, Storrs, Conn. 06268.

Agencies:

Connecticut Forest & Park Association, 1010 Main Street, P. O. Box 289, East Hartford, Connecticut.

Interregional Planning Commission, Dept. of Agriculture & Natural Resources, State Office Building, Hartford, Connecticut 06115.

Department of Agriculture & Natural Resources, (Joseph N. Gill, Commissioner), State Park & Forest Commission, (Donald C. Mathews, Director), State Office Building, Hartford, Connecticut 06115.

Connecticut State Board of Fisheries & Game, (Theodore B. Bampton, Director), State Office Building, Hartford, Connecticut 06115.

Cooperative Extension Service, Box U-36, The University of Connecticut, Storrs, Connecticut 06268.

Bureau of Outdoor Recreation, Regional Director, 128 N. Broad Street, Philadelphia, Pennsylvania 19107.

Soil Conservation Service, N. Paul Tedrow, Route 44A, Mansfield, Connecticut.

May 1969
Connecticut Cooperative Extension Service, E. J. Kersting, Director, Storrs, Conn. Issued in furtherance of the Acts of Congress of May 8 and June 30, 1914. (UP900)

GUIDE SHEET #14

STRATEGIES FOR PRESERVING OPEN SPACE

The following strategies may prove to be useful if you are interested in developing a program for preserving open space in your community.

1. Focus your attention on the preservation of a specific open space area.

2. Become knowledgeable about the subject of open space preservation and management. Work on educating yourself and the people who will be working with you.

3. Acquire information on the site in question. Information on ownership, historical value, exact location, unique geological features and a biological inventory would be valuable.

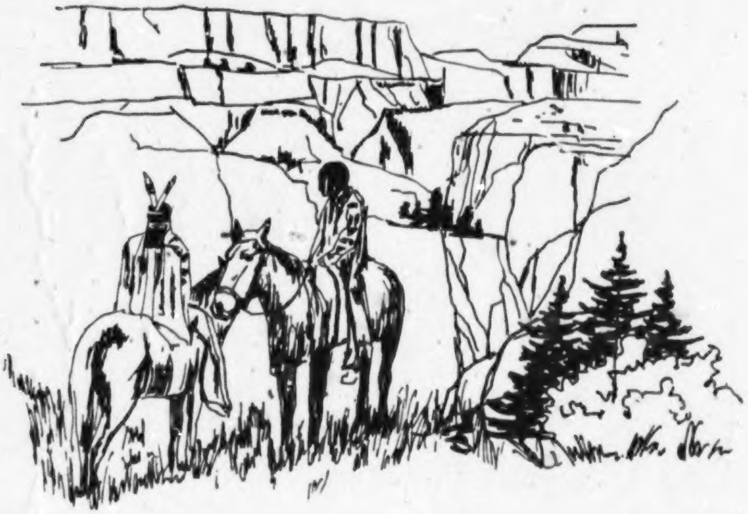
4. Obtain copies of regional, state and federal laws which will affect your project.

5. Inform the public of your proposal in a clear, concise but factual manner.

6. Appeal to both public and political leadership for support for your proposal.

7. Focus attention on the positive goals and long term benefits to be gained by individuals and the community.

Good Luck in your efforts!



THE AMERICAN INDIAN TREATED THE LAND AS A TRUST FROM HIS GODS. FOR 9,000 YEARS HE LIVED IN HARMONY WITH FIELDS AND RIVERS, MOUNTAINS AND PLAINS.

WORDS WORTH KNOWING.

1. BOG. Wetlands where the accumulation of sphagnum moss as peat results in a floating peat mat which grows outward from the shore and eventually covers the water surface completely.

2. CARRYING CAPACITY. Maximum population of plants, animals or humans which a given ecosystem can support indefinately.

3. DIVERSITY. A measure of the biological complexity of a system which includes the total number of different kinds and the evenness of numbers of each kind.

4. ECOSYSTEM. A self-regulating and self-sustaining community of organisms considered to be in relationship with each other and their environment.

5. ENVIRONMENT. The sum total of external conditions which influence the life of an individual organism or population.

6. GREENBELT. An area of parks and unoccupied ground surrounding a town.

7. LANDFILL. Place where earth or solid waste is dumped, usually to create new land for development or to dispose of garbage.

8. MACRO-OPEN SPACE. Large areas of open space.

9. MEGALOPOLIS. A very large continuous urban area or city belt formed by the joining or near joining of adjacent cities.

10. MICRO-OPEN SPACE. Small areas of open space.

11. MONOCULTURE. Cultivation of a single crop exclusively to the exclusion of other crops on a piece of land.

12. NONRENEWABLE RESOURCE. A resource such as minerals, coal and oil which is found as a fixed, depletable supply in the earth.

13. OPEN SPACE. A predominatly vacant land or water area of sufficient size, utility or beauty that its presence is a public benefit.

14. POPULATION GROWTH. Increase in population size over a period of time.

15. RESOURCE. An economically useful material which is utilized for some aspect of modern industry, and technology.

16. RURAL. A general term indicating the variety of habitats found in the country, including farms, woodlots and meadows.

17. RURAL-URBAN SHIFT. Modern day movement of population from the city to the rural environs or countryside.

18. SUBURBAN. An area of predominatly housing developments, apartments and condominiums which usually lie in a belt on the outskirts of an urban center.

19. UPLAND. Elevated land which does not have standing water cooling it for any period of the year.

20. URBAN. The industrial and business district of a city.

21. WETLAND. Any area which has standing or running water covering it for at least a portion of the year.

22. WOODLOT. A small forest or stand of trees, usually grown and preserved for economic and recreational usage.

BIBLIOGRAPHY

Brenneman, Russell L. *Private Approaches to the Preservation of Open Land*. Conservation and Research Foundation, 1967.

Information on transfer, trusts, and tax aspects of open space preservation for the private citizen.

Bureau of Outdoor Recreation. *A Directory of Private Organizations Providing Assistance in Outdoor Recreation, to Individuals, Organizations, Public Groups*. Dept. of Interior, Washington, D.C. (Available from Govt. Printing Office, Supt. of Documents, Washington, D.C. 20402).

Central Naugatuck Valley Regional Planning Agency. *Open Space: A study of Alternative Legal Methods of Preservation*. Waterbury, Conn. 1968.

A local study of open space acquisition and preservation.

Little, Charles. *Challenge of the Land*. Open Space Action Institute. New York, New York. 1968. 151 pp.

A "How to do it" action paperback which emphasizes the methodology of planning and aquisition of open space. Includes information on Land Donations and the Economic Effects of preservation. Recommended.

McHorg, Ian L. *Design with Nature*. Doubleday/Natural History Press. New York, New York. 1969. 200 pp.

An excellently illustrated introduction to land use, especially with regard to the design of towns and cities with a view to preserve open spaces and enhance the quality of life environment. Highly Recommended.

Wallace, David, ed. *Metropolitan Open Spaces and Natural Processes*. University of Pennsylvania Press, Philadelphia. 1970.

A collection of articles dealing with a variety of open space issues, particularly as they relate to large metropolitan centers

Whyte, William H. *Cluster Development*. American Conservation Association, New York. 1964. 130 pp.

Although ostensively dealing with the economics and utility of cluster development for a community, this book presents much interesting information on the handling of urban and suburban open space.

Whyte, William H. *The Last Landscape*. Doubleday Press, New York. 1968.

Considered by some to be the best single work on open space. Presents all aspects fairly. Highly Recommended

Wyman, Edgan P. and Miklos J. Gratzer. *Priorities in Open Space Planning and Acquisition*. Connecticut Cooperative Extension Service, Storrs, Conn. 1969. 7 pp.

This little booklet provides a brief but excellent step by step introduction for groups undertaking local open space acquisition and preservation. Recommended.

Land - The Most Enduring Gift - prepared by the Connecticut Department of Environmental Protection.

This pamphlet describes the benefits and alternative methods of donating land.

Statewide Comprehensive Outdoor Recreation Plan - Citizens' Summary - prepared by State of Connecticut Department of Environmental Protection.

This pamphlet describes the state strategy for meeting growing needs of Connecticut's citizens for expanded outdoor recreation and increased natural resource protection.

Audio Tape Script

OPEN SPACE UNIT

WELCOME TO THE UNIT ON OPEN SPACE. IN THIS UNIT, WE WILL BE DISCUSSING THE VARIED MEANINGS AND VALUES OF OPEN SPACE. THE TERM OPEN SPACE HAS RECEIVED A GREAT DEAL OF USAGE DURING THE PAST FEW YEARS. QUITE FREQUENTLY, AT TOWN MEETINGS, OR IN THE STATE LEGISLATURE, REFERENCE IS MADE TO THE PURCHASE OR RETENTION OF LAND FOR OPEN SPACE. FURTHERMORE, ENVIRONMENTAL PLANNING AGENCIES AT ALL LEVELS OF LOCAL, STATE, AND FEDERAL GOVERNMENT FOCUS THEIR ATTENTION ON THE PRESERVATION, MANAGEMENT AND USE OF OPEN SPACE.

JUST WHAT IS OPEN SPACE? WHY HAVE LOCAL AND STATE GOVERNMENTS BECOME SO INTERESTED IN PURCHASING, PRESERVING, AND MANAGING OPEN SPACE? ARE OPEN SPACES IN DANGER OF BEING LOST? IF SO, WHAT FORCES OR PRESSURES ARE ENDANGERING THEM? WHAT CAN WE DO TO ENSURE THE PRESERVATION OF OPEN SPACE? ARE THEY WORTH SAVING, OR PERHAPS ARE TRADEOFFS ACCEPTABLE FOR THE LOSS OF OUR OPEN SPACE?

THE ANSWERS TO MANY OF THESE QUESTIONS WILL PROBABLY OCCUR TO YOU AS YOU PROCEED THROUGH THIS UNIT.

YOU MAY BE SURPRISED TO LEARN THAT ONE OF THE MAJOR PROBLEMS ENCOUNTERED IN THE DEVELOPMENT OF EFFECTIVE STRATEGIES FOR THE PURCHASE AND CONSERVATION OF OPEN SPACE HAS BEEN RELATED TO THE AMBIGUITY OF THE CONCEPT OF OPEN SPACE. THIS STEMS FROM THE FACT THAT WE TEND TO PERCEIVE OPEN SPACE AS BOTH AN ENVIRONMENTAL AND A SOCIOLOGICAL PHENOMENON. THAT IS, WE TEND TO ASSOCIATE OPEN SPACE WITH NATURAL ENVIRONMENTS SUCH AS STREAMS, WOODS, BEACHES AND AGRICULTURAL LAND. THIS IS PERHAPS THE MOST COMMON ASSOCIATION. IN A SOCIOLOGICAL SENSE, HOWEVER, OPEN SPACE MAY REFER TO RELATIVELY SMALL LAND UNITS WHICH PROVIDE AVENUES OF GREENERY AND OFFER A SENSE OF RELIEF AND PRIVACY TO US AS INDIVIDUALS. THUS, A CITY PARK, ZOO, CEMETARY OR EVEN A VACANT LOT WOULD BE A FORM OF OPEN SPACE. THE BASIC DIFFERENCES IN THE SIZE OF OPEN SPACE AREAS HAS LED TO A DELINEATION BETWEEN MACRO OPEN SPACE AND MICRO OPEN SPACE AREAS. BY MACRO OPEN SPACE WE REFER TO LARGE AREAS OF UNDEVELOPED LAND. MICRO OPEN SPACE IS THEN DEFINED AS RELATIVELY SMALL AREAS LOCATED IN GENERALLY BUILT UP, INDUSTRIAL MUNICIPAL, AND RESIDENTIAL AREAS.

DESPITE THE FACT THAT LAND USE PLANNERS ARE IN GENERAL AGREEMENT THAT OPEN SPACE IS DESIRABLE, THERE EXIST MANY DIFFERENT VIEWS CONCERNING THE NATURE AND USE OF OPEN SPACE.

ON GUIDE SHEET #2, THERE ARE FOUR QUOTES DESCRIBING INDIVIDUAL PERSPECTIVES ON OPEN SPACE. READ ALONG WITH ME AS WE DISCUSS THE FOUR VIEWS OF OPEN SPACE PRESENTED ON GUIDE SHEET #2... ALDO LEOPOLD, ONE OF AMERICA'S FIRST AND FOREMOST CONSERVATIONISTS SUGGESTED THAT: "WILDERNESS IS THE RAW MATERIAL OUT OF WHICH MAN HAS HAMMERED THE G.S. #2 artifact called civilization."

Slide #

It is easy to see where Aldo Leopold placed his priorities. Now look at slide #1, as we contrast Leopold's view with that of New York writer Richard Goldstein who wrote: "I find I am disoriented by space. New York City has taught me the solace of walls. I feel more comfortable in a subway than in a field, more willing to concentrate on something with momentum than a landscape that will not flicker or revolve. I do not absorb scenery: rather, it turns me meditative and remote. Walking through the woods, I fall into that self enclosing contemplation which one erects to prevent boredom."

Surely, no greater disparity could exist than that evident between these two views. What these differing views of the concept of open space do in fact, is present us with a realization of the diversity of human needs and desires. Therefore, in setting up and planning open space for the present and future we ought to provide a rich diversity of spaces which match the diversity of human needs.

Being aware of this, the Connecticut Land Planning Commission stated the following definition of Open Space: "Open Space is generally undeveloped, or predominatly undeveloped land which has value for active or passive recreation". Furthermore, "To be open space, land need not be entirely undeveloped or unbuilt upon. Parks, greenbelts, farms, golf courses, a backyard, a zoo, or a cemetary may also be included in the definition of open space. Open space may encompass a wide variety of land uses which have low economic return and low frequency of use by a single individual." Because of the low economic return on these areas, public action and control is the most probable method of preservation. Now look at slide #2. Slide #2

A definition very similar to that of the Commission on Open Space has been developed by metropolitan Boston. In their opinion, the term open space does not describe a particular type or use of land. It is simply a predominatly vacant land or water area of sufficient size, utility or beauty that its presence is a public benefit.

Which concept of open space best fits your feelings -- Leopold's, Goldstein's, Boston's, or the Commission's? To help you identify your personal open spaces and clarify your feelings towards space in general, complete the activity in part B of Guide Sheet #2. The activity focuses on space in your personal environment.

Begin by completing the list of spaces in your personal life. Think of your movement throughout the entire day. What places do you visit? Where do you find peace and quiet during the day or in the evening? What spaces do you enjoy most? What places do you enjoy the least? After you are finished with your list, rate each space in terms of its importance to you. Turn the recorder off while you think and write. (Pause)

Now that you have focused your attention on the various types of space which are of importance to you in your daily activity, let us extend our thinking to open space in genral.

On guide sheet #3, you will find a list of a variety of open space areas. In your estimate are these areas open space? How important are these areas to you? Stop the recorder, while you work on the activity on Guide Sheet #3. G.S. #3

As you look at the list, take note of the fact that all of these kinds of spaces exist in the State of Connecticut. But, there is another question to be asked about these areas. . . Are areas such as these available for open space classification and usage? To answer this and other related questions let us consider the concept and aims of the Connecticut Commission regarding open space in more detail.

After much study, the Commission reached two basic conslusions. First, Connecticut is faced with an expanding population and; second, acknowledged population expansion will pose a continuing threat to existing areas classifiable as open space. The Connecticut Planning Commission therefore is calling for a goal of a minimum open space pattern to consist of at least 25% of the state's available land. According to a recent issue of the Connecticut Conservation Reporter entitled "The Vanishing Land" approximately 700,000 acres of the state's 3.1 million acres are open space. This amounts to about 44%, which is well above the goal set by the Planning Commission. It is important to remember, however, that not all of this land is permanently open space. Many acres of open space not protected by government or private conservation organizations are continuously being converted to more intensive uses. On guide sheet #4, you will find a graphic representation of Connecticut's present open space. Note that, except for vacant lots in cities and towns, the open space is in fact a kalidioscope of the Connecticut countryside. (Pause 5 sec.) G.S. #4

While cognizant of the need for a diversity of open space landscapes, the Connecticut Commission is intent on preserving special areas which have critical and frequently unique scenic, historical, recreational, ecological, and other environmental qualities worth preserving. Areas which are receiving major emphasis include state parks and forests, agricultural lands and inland and coastal wetlands.

Land that is categorized as open space can usually be divided into two cate-

GORIES: LOCAL AND REGIONAL. LOCAL OR MUNICIPAL OPEN SPACES ARE USUALLY PARKS, RECREATION AREAS, CONSERVATION AREAS OR VACANT LOTS THAT MEET THE NEEDS OF A TOWN, CITY, OR LOCAL POPULATION. THE SCALE AND SIZE OF THE FACILITY IS DESIGNED TO SATISFY THE NEEDS OF ITS IMMEDIATE NEIGHBORS. STATE OR REGIONAL OPEN SPACE CAN INCLUDE LOCAL OPEN SPACE, BUT IT IS GENERALLY INTENDED TO MEET THE NEEDS OF A GREATER NUMBER OF PEOPLE. A STATE PARK, FOR INSTANCE, IS INTENDED TO SERVE MANY TOWNS RATHER THAN THE RESIDENTS OF A SINGLE TOWN.

IN 1974, THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION PREPARED A STATEWIDE COMPREHENSIVE OUTDOOR RECREATION PLAN REFERRED TO AS SCORP. THE CITIZENS SUMMARY OF SCORP IS INCLUDED IN YOUR KIT. SCORP IS THE STATE OF CONNECTICUT'S STRATEGY FOR EXPANDED OUTDOOR RECREATION AND INCREASED NATURAL RESOURCE PROTECTION. DO YOU KNOW HOW MUCH OPEN SPACE IS FOUND IN YOUR COMMUNITY AND ITS VICINITY? USE THE ACTIVITY ON GUIDE SHEET # 5, TO LOCATE OPEN SPACE AREAS NEAR YOUR TOWN. TURN THE TAPE RECORDER OFF WHILE YOU COMPLETE THE ACTIVITY ON GUIDE SHEET # 5. G.S. #5

YOU NOW KNOW WHERE THE OPEN SPACE AREAS ARE LOCATED WITHIN AND AROUND YOUR COMMUNITY. IN YOUR OVERALL EVALUATION, DID YOU FIND THE AMOUNT OF OPEN SPACE SUFFICIENT TO MEET THE NEEDS OF YOUR COMMUNITY? IS THERE SUFFICIENT OPEN SPACE TO MEET THE DEMANDS WHICH AN INCREASING POPULATION WILL PLACE ON THE AREAS IN ANOTHER 25 YEARS? WHAT CAN BE DONE TO PRESERVE OR INCREASE THE AMOUNT OF OPEN SPACE AVAILABLE TO MEMBERS OF YOUR COMMUNITY? WE WILL DISCUSS SOME POSSIBLE ANSWERS TO THESE QUESTIONS LATER IN THE UNIT.

DESPITE THE FACT THAT CONNECTICUT PRESENTLY HAS A LARGE AMOUNT OF OPEN SPACE, MANY PEOPLE BELIEVE THAT THERE IS CAUSE FOR CONCERN. OPEN SPACE ON A PER CAPITA BASIS IS RAPIDLY DWINDLING. DURING THE 13 YEAR PERIOD FROM 1959 THROUGH 1972 MORE THAN ONE HALF OF CONNECTICUT'S FARMS WERE SOLD OFF TO DEVELOPERS AND LAND SPECULATORS. SIMILARLY, FORESTS AND WOODLOTS ARE RAPIDLY BEING LOST AS POTENTIAL LONG TERM OPEN SPACE AREAS.

THIS BRINGS US TO A CRITICAL QUESTION. WHAT IS THE FUNCTION AND UTILITY OF OPEN SPACE? OR, PUT IN A CONTRARY WAY, IF OPEN SPACE IS RAPIDLY DISAPPEARING PERHAPS IT IS BECAUSE WE DON'T REALLY NEED IT. AFTER ALL, DO NOT THE PRIORITIES OF HUMANS AND THEIR TECHNOLOGICAL CIVILIZATION COME FIRST?

THINK ABOUT IT FOR A MINUTE. HOW WOULD YOU EXPLAIN THE NEED TO PRESERVE OPEN SPACE? WHY IS OPEN SPACE IMPORTANT TO A COMMUNITY? GUIDE SHEET # 6 LISTS FIVE FACTORS WHICH ARE CONSIDERED TO BE THE MAJOR FUNCTIONS OF OPEN SPACE. (PAUSE)

AS YOU LOOK AT DIFFERENT TYPES OF OPEN SPACE AREAS, YOU WILL FIND THAT THEY PERFORM DIFFERENT FUNCTIONS. IN PART B OF GUIDE SHEET # 6 YOU WILL FIND A MATRIX OF OPEN AREA TYPES AND FUNCTIONS. EVALUATE EACH OPEN AREA TYPE, AND PUT A CHECK IN EACH COLUMN WHICH REPRESENTS A FUNCTION OF THAT PARTICULAR TYPE OF OPEN SPACE. STOP THE RECORDER WHILE YOU WORK ON GUIDE SHEET # 6B.

G.S. #6

LET US EXAMINE EACH OF THE MAJOR FUNCTIONS OF OPEN SPACE AS THEY ARE PRESENTED IN GUIDE SHEET # 6 AND CONSIDER THE POTENTIAL WEIGHT THEY CARRY AS VALID REASONS FOR OPEN SPACE PRESERVATION.

SLIDE #3

UNDOUBTEDLY OF PRIMARY IMPORTANCE TO URBAN AND SUBURBAN DWELLERS IS THE UTILITY OF OPEN SPACE FOR RECREATIONAL ACTIVITY. THE ESTABLISHMENT OF RECREATIONAL OPEN SPACE AREAS such as that shown in slide #3 (Pause) IS OFTEN A DIRECT RESPONSE TO CITIZEN DEMAND FOR INCREASED RECREATIONAL OPPORTUNITIES. IT BASICALLY STEMS FROM THE FACT THAT TODAY THERE ARE MORE PEOPLE WITH MORE MONEY AND MORE LEISURE TIME THAN THERE HAVE EVER BEEN BEFORE IN THE HISTORY OF OUR COUNTRY. THIS NEW BREED OF INDIVIDUAL PREFERS A COMBINATION OF SOLITARY AND FAMILY ORIENTED RECREATIONAL ACTIVITIES SUCH AS BASEBALL, TENNIS, GOLF, HIKING, PICNICING, CAMPING, BICYCLING AND BOATING. NOW LOOK AT SLIDE #4.THE CONNECTICUT COMMISSION IS VITALLY INTERESTED IN INCREASING THE TOTAL ACREAGE OF STATE PARKS AND FORESTS. A SIMILAR RESPONSE ON THE LOCAL LEVEL IS REFLECTED BY THE NUMBER OF TOWNS WHICH HAVE ESTABLISHED TOWN BEACHES, PARKS AND NATURE CENTERS. FURTHERMORE, BECAUSE RECREATIONAL USE OF OPEN SPACE IS EXPECTED TO TRIPLE BY THE YEAR 2000 THE AQUISITION OF OPEN SPACE SUFFICIENT TO MEET FUTURE DEMANDS ASSUMES PARAMOUNT IMPORTANCE.

SLIDE #4

SLIDE #5

THE SECOND MAJOR FUNCTION OF OPEN SPACE, THE PROVISION OF AN ATTRACTIVE COMMUNITY DESIGN, ASSUMES PARTICULAR IMPORTANCE ON THE URBAN AND SUBURBAN LEVEL. See slide #5. JUST WHY SHOULD OPEN SPACE BE CONSIDERED NECESSARY FOR AN ATTRACTIVE COMMUNITY DESIGN? THE ANSWER SEEMS TO LIE IN SEVERAL BASIC HUMAN REQUIREMENTS. FIRST, WE SEEM TO REQUIRE DIVERSITY IN OUR ENVIRONMENTS. IN FACT, WHEN GIVEN THE CHOICE, WE OPT FOR DIVERSITY OF OUR LANDSCAPES. THUS URBAN AND SUBURBAN OPEN SPACE PROVIDE US WITH A WELCOME CHANGE OF SCENERY WHICH HELPS TO ALLEVIATE THE MONOTONY OF THE CONCRETE SPRAWL. SECOND, MOST HUMANS HAVE THE SEEMINGLY INHERENT NEED FOR GREEN THINGS IN THEIR SURROUNDINGS. THE CITY DWELLER WHO RAISES HOUSE PLANTS BEARS MUTE TESTIMONY TO THIS NEED. OR, IS IT PERHAPS A FIXTURE OF OUR EVOLUTIONARY HERITAGE THAT WE REQUIRE SOME VEGETATION HOWEVER SPARSE IN OUR SURROUNDINGS? THIRD, AND PERHAPS MOST IMPORTANT, OPEN SPACES IN HEAVILY POPULATED AND INDUSTRIALIZED AREAS PROVIDE US WITH A SERIES OF BUFFER ZONES BETWEEN HUMANS AND THEIR TECHNOLOGICAL ACTIVITIES. THESE ACT AS SAFETY ZONES WHICH HELP SHIELD US FROM THE NOISE AND AIR POLLUTION GIVEN OFF BY AIRPORTS, MAJOR TRANSPORTATION ARTERIES AND HEAVY INDUSTRIES. OPEN SPACE AREAS GREATLY ALLEVIATE LEVELS OF POLLUTION BY

ACTING AS BARRIERS TO SOUND WAVES AND DUST PARTICLES IN THE AIR. THE NEED FOR AN ATTRACTIVE COMMUNITY DESIGN INCORPORATING OPEN SPACE IS FINALLY BEING REALIZED BY TOWN AND CITY PLANNERS. RECENTLY CONSTRUCTED MODEL CITIES IN FINLAND AND CANADA WHICH INCORPORATE THE USE OF OPEN SPACE FORMS CALLED GREENBELTS ARE CURRENTLY BEING STUDIED TO ASCERTAIN THE FEASABILITY OF WIDESPREAD ADOPTION. THE RESULTS, IT IS HOPED, WILL SHOW THE WAY TO EXCITING, ATTRACTIVE CITIES OF THE FUTURE.

COMMUNITY DESIGN CAN ALSO MAKE A LARGE DIFFERENCE IN THE QUALITY AND QUANTITY OF OPEN SPACE IN A COMMUNITY. THE IDEA OF CLUSTERING HOMES TOGETHER AND USING THE SURROUNDING SPACE AS COMMON GREENS, SQUARES OR RECREATION AREAS IS CENTURIES OLD: IT IS THE PRINCIPLE OF THE EARLY NEW ENGLAND TOWN. CLUSTER IS COMMONLY DEFINED AS THE REDUCTION IN SIZE OF INDIVIDUAL HOUSE LOTS IN A SUBDIVISION, AND THE COMBINING OF THIS CONSERVED LAND INTO A SHARED OPEN SPACE FOR ENVIRONMENTAL PRESERVATION AND RECREATION. THE ADVANTAGES AND DISADVANTAGES OF CLUSTER HOUSING WILL BE DISCUSSED IN THE SYNTHESIS AND LOCAL IMPLEMENTATION A-T UNIT.

FOR PURPOSES OF THIS UNIT, LET US SIMPLY SAY THAT CLUSTER HOUSING DOES PERMIT THE USE OF OPEN SPACE IN COMMUNITY DESIGN. THE CONCEPT OF USING CLUSTER HOUSING TO PROVIDE OPEN SPACE IS ILLUSTRATED ON GUIDE SHEET # 7. NOTE THE OPEN SPACE AREAS CREATED BY CLUSTERING HOUSES IN PART A OF GUIDE SHEET # 7 IN CONTRAST TO THE DISTRIBUTING OF SPACE IN A NORMAL SUBDIVISION. NORMALLY, CLUSTERING DOES NOT INCREASE THE NUMBER OF HOUSES IN A GIVEN LAND AREA, BUT IT DOES CHANGE THE WAY IN WHICH THE LAND IS DISTRIBUTED AND USED. G.S. #7

AS A THIRD MAJOR FUNCTION OF OPEN SPACE, THE MAINTENANCE OF NATURAL PROCESSES FINDS ITS BEST APPLICATION IN RURAL AREAS. THIS IS PARTLY BECAUSE LARGE AREAS OF OPEN SPACE ARE GENERALLY NEEDED FOR THE HARMONIOUS BIOLOGICAL RELATIONSHIPS WHICH ARE PART OF A NATURALLY FUNCTIONING AND SELF MAINTAINING AND PRESERVING ECOSYSTEM. LARGE OPEN SPACE AREAS ARE NATURALLY TO BE FOUND IN RURAL AREAS. WE ARE FORTUNATE IN THAT SOME OF THE OPEN SPACE FOUND IN RURAL AREAS TODAY IS NOT SUITED FOR DEVELOPMENT. EXAMPLES OF SUCH OPEN AREAS ARE STEEP SLOPES, RIDGES, AND ROCKY HILLSIDES. THESE PROVIDE US WITH OPEN SPACE WHICH CONTAINS THE NECESSARY SIZED LAND AREAS PLUS THE ADDED BENEFIT OF THE INCREASED DIVERSITY OF LANDFORMS.

THERE ARE OTHER REASONS FOR RURAL OPEN SPACE PRESERVATION AS WELL. AS SHOWN IN SLIDE #6 SOME OPEN SPACE AREAS ARE HISTORICALLY SIGNIFICANT. THEY PROVIDE AN IMMEASURABLE CONTRIBUTION TO OUR HERITAGE AS A STATE AND AS A NATION. GENERALLY NO FURTHER AGREEMENTS NEED BE ADVANCED FOR THE PRESERVATION OF SUCH SITES. SLIDE #6

Guide sheet # 8 consists of the Bicentennial Edition of Points of Interest. G.S. # The booklet lists dozens of historical points of interest in Connecticut. Take a few minutes to locate some open space areas near your community, which preserve historical sites. Stop the recorder while you look at Points of interest.

Another criterion is rarity. Connecticut has some open space environments that exist in few other places. One such area is shown in slide #7. - This is SLIDE # a sand plains ecosystem, one of several to be found adjacent to the Quinnipiac River floodplain in Central Connecticut. It is only in sand plains that we find certain unique plants and animals. Such natural environments are productive as well as rare. They provide a great element of variety. If they are not protected and preserved, then the total human environment becomes that much less diverse. Compare the next slides, #8 and #9 and decide which type of environment you prefer. (Pause) Stop the recorder while you view slides #8 and #9. SLIDES #8 & #

There is often confusion between the terms open space and natural areas. All open spaces are NOT natural areas. A natural area is a land or water unit where natural conditions are maintained or encouraged in so far as possible. Natural conditions result from allowing ordinary physical and biological processes to operate with a minimum of human intervention. The Nature Conservancy is a national membership organization devoted wholly to the preservation of critical natural areas. Guide sheet # 9 G.S. # contains a list of some of the criteria the Nature Conservancy uses in evaluating their sites. The list may be useful to you in selecting natural areas within your community. You may want to call upon the Nature Conservancy to aid in preserving natural areas. Turn off the tape recorder while you read guide sheet # 9. (Pause)

Do the reasons for preserving open space outlined on Guide sheet # 6 seem G.S. # significant to you? They are so significant that the Connecticut Planning Agency is trying to purchase additional open space and thereby ensure its preservation. Their task is difficult in the face of expanding population and rising land costs.

Basically, population growth causes an increased demand for land. Look at SLIDE slide # 10, competition for available land today is so intense that land values have risen over 100 per cent within the past ten years. Most affected, are farms and woodlots located on the fringes of urban and suburban environments, since these areas are easily developed. When these valuable land areas are developed, they become the source of increased tax revenue for local governments.

Rising costs of farming and decreasing farm profits are also responsible for putting open space on the real estate market. Although gross farm income rose by $6.5 million between 1968 and 1973 the net income of farmers dropped by $12.2 million, chiefly because of increased labor costs and inflation. Small wonder

THAT FARMERS ARE DROPPING OUT OF THE FARM PICTURE AND SELLING THEIR OPEN SPACE PROPERTIES. FARMERS HOWEVER, ARE NOT THE ONLY LOSERS, YOU AND I, AS CONCERNED CITIZENS - AND THE COMMUNITY WILL ALSO HAVE LOST A VALUABLE RESOURCE!

WHAT HAS BEEN DONE TO ALLEVIATE THIS DEPLORABLE PROBLEM? FOR ONE, THE CONNECTICUT LEGISLATURE HAS PASSED INTO LAW PUBLIC ACT 490 WHO PROVIDES TAX RELIEF TO OPEN SPACE OWNERS.

PUBLIC ACT 490 ATTEMPTS TO MAINTAIN OPEN SPACE BY TAXING THIS LAND BASED ON AN ASSESSMENT OF ITS "USE" VALUE RATHER THAN "MARKET" VALUE. UNDER USE VALUE ASSESSMENT, THE TAX BASE VALUE OF LAND IS RELATED TO ITS POTENTIAL EARNING CAPACITY WHEN USED IN BROAD LAND CLASSES UNDER THE LAW. THE LAND CLASSES ARE FARM LAND, FOREST LAND, AND OPEN SPACE. UNDER MARKET VALUE ASSESSMENT, THE TAX BASE VALUE OF LAND IS RELATED TO POTENTIAL SALES VALUE BASED UPON "COMPARABLE SALES" IN A FAIR MARKET TRANSACTION IN THE TOWN. THE FOLLOWING EXAMPLE WILL HELP EXPLAIN THE DIFFERENCE BETWEEN USE VALUE AND MARKET VALUE.

LET US USE A TWO ACRE PASTURE NEXT TO A SUBURBAN DEVELOPMENT. HOUSE LOTS IN THE AREA HAVE BEEN SELLING AT $6,000 PER ACRE. UNDER MARKET VALUE THE TWO ACRES OF PASTURE WOULD BE ASSESSED AT $12,000 OR $6,000/ACRE BECAUSE POTENTIALLY THIS IS THE VALUE OF LAND IN AN OPEN MARKET. BY USE VALUE, THE SAME PARCEL WOULD BE ASSESSED AT $250/ACRE TO $500/ACRE SINCE THIS IS THE VALUE THE FARMER WOULD RECEIVE FROM UTILIZING THE PASTURE. IT IS OBVIOUS THAT IN THE SAME TOWN THE TAXES BASED ON USE VALUE ASSESSMENT WOULD BE LOWER THAN UNDER MARKET VALUE ASSESSMENT.

THIS WAS THE PURPOSE OF THE ACT. LEGISLATORS REASONED THAT IF TAXES WERE LOWER ON FARM, FOREST, AND OPEN SPACE AREAS A LAND OWNER WOULD BE MORE LIKELY TO MAINTAIN THEM IN THAT CONDITION AND THEREFORE MAINTAIN A COMMUNITY ASSET.

GUIDE SHEET # 10 PROVIDES MORE DETAILS ON PUBLIC ACT 490. IT POINTS OUT PROBLEMS WITH THE LAW THAT HAVE BEEN CORRECTED BY SUBSEQUENT LEGISLATION. TURN OFF THE RECORDER WHILE YOU READ GUIDE SHEET # 10. G.S. #10

PUBLIC ACT 490 IS ONLY ONE METHOD OF ENCOURAGING THE MAINTENANCE OF ADEQUATE OPEN SPACE. CONTINUED EFFORTS BY BOTH THE PUBLIC AND PRIVATE SECTOR ARE NECESSARY TO ADEQUATELY PLAN FOR AND MAINTAIN OPEN SPACE AREAS. ON GUIDE SHEET #11, WE HAVE LISTED THE PUBLIC AND PRIVATE AGENCIES INVOLVED IN OPEN SPACE AQUISITION AND MANAGEMENT. IF YOU ARE INTERESTED IN THE ISSUE OF PRESERVING OR MANAGING OPEN SPACE WE SUGGEST YOU CONTACT THOSE AGENCIES LISTED ON GUIDE SHEET # 11, WHICH CAN AID YOU IN YOUR WORK . . . G.S. #11

THERE ARE TWO MAJOR METHODS OF LAND PROTECTION: REGULATION TO PROTECT OPEN SPACE OR AQUISITION OF INTERESTS IN LAND. WITHIN THE REGULATION OPTIONS, THERE ARE THREE SUBSECTIONS: THE FIRST IS THE POLICE POWER OF GOVERNMENT. REGULATIONS OF THIS TYPE INCLUDE ZONING OR SUBDIVISION CONTROLS. THE SECOND SUBSECTION INVOLVES the powers of taxation such as Public Act 490 or use value assessment. And finally, regulations that control developers such as air and water quality acts, sewer moratorium, or consumer legislation.

Aquisition of Interests in land can involve the purchase, lease or gift of land or less than full control can be obtained by easements or the purchase of certain rights in the property such as air, mineral, or development rights.

Information about methods of open space aquisition and preservation is available in two forms in this unit. Guide sheet #12 provides a summary of various methods of regulating open space and outlines alternative procedures for acquirinng interests in land. Also included in the land use decision making kit is a pamphlet entitled Land, Most Enduring Gift prepared by the Connecticut Department of Environmental Protection. This pamphlet provides prospective donors of land and water with information on the mechanics of transferring ownership or rights in land to a public or private organization. The pamphlet explains the options and alternative methods of accomplishing this goal. We suggest that you read this pamphlet if you are in a position to make a donation of land to a public or private land trust or know someone who might be so inclined. Some land in a land trust is shown in slide #11.

G.S. #12

SLIDE #1

If more information beyond the guide sheet #12 and the pamphlet are necessary, there are some excellent sources in the bibliography which provide information on this topic. As you will recall, guide sheet # 11 contains a list of public and private agencies involved in the aquisition and maintenance of open space. If will be useful reference to refer to if you know of a parcel of land in your community or state that should be protected as permanent open space.

How may you and your friends help acquire and preserve open space for your community? Included in this unit is a booklet entitled, Priorities in Open Space Planning and Acquisition, which you ought to read before you begin your open space campaign. The booklet is included as guide sheet #13.

G.S. #1

Let us outline several of the basic ideas concerning open space planning. An outline of strategies is presented on guide sheet #14. Use this as a reference as we continue our discussion.

G.S. #1

First, determine what your campaign will be, that is, just what open space do you feel ought to be acquired and preserved? Perhaps you have read about some marsh fill development to take place in your area. Or perhaps a historical building is scheduled to be demolished to provide a city parking lot. In short, recognize a particular goal - it will then be much easier to generate enthusiasm and support for your cause.

Second, you must become knowledgeable about your subject. Unfortunately, enthusiasm and support count for little unless you can show that you are well informed about the open space preservation issue. In short, know what you are

TALKING ABOUT. THIS UNDOUBTEDLY MEANS THE ESTABLISHMENT OF A RIGOROUS PROGRAM OF SELF-EDUCATION FOR YOU AND YOUR GROUP, YOU WILL WANT TO DRAW UPON MANY AVAILABLE SOURCES FOR YOUR INFORMATION. YOU WILL HAVE TO BE WELL INFORMED ABOUT PRINCIPLES OF OPEN SPACE PRESERVATION AND MANAGEMENT AND LAND USE IN GENERAL. NEWSPAPERS PROVIDE AN INITIAL STARTING POINT - NOT JUST ONE, BUT SEVERAL, PREFERABLY THOSE WHICH OFFER A VARIETY OF CONTRASTING VIEWPOINTS. NEXT OBTAIN BOOKLETS AND PAMPHLETS PUT OUT BY CONSERVATION AGENCIES. ALSO INQUIRE AT LOCAL (AND NATIONAL) BUSINESS AND INDUSTRIES TO OBTAIN MATERIALS EXPRESSING THEIR VIEWPOINTS. AFTER YOUR BASIC PERIOD OF FAMILIARIZATION, BECOME AQUAINTED WITH THE MORE TECHNICAL BOOKS AND RESEARCH JOURNALS WHICH MAY BE READ IN YOUR LOCAL LIBRARY. A BASIC BIBLIOGRAPHY OF READING MATERIALS CAN BE FOUND AT THE END OF THE GUIDE SHEETS FOR THIS UNIT. AFTER DEVELOPING A READING BACKGROUND, YOU MAY FIND A GROUP DISCUSSION TO BE A PROFITABLE MEANS OF ANALYZING AND SYNTHESIZING THE INFORMATION OBTAINED.

THIRD, WRITE AND OBTAIN COPIES OF REGIONAL, STATE AND FEDERAL LAWS WHICH WILL AFFECT YOUR PROJECT. ASK YOUR POLITICAL REPRESENTATIVE HOW THESE LAWS MAY AFFECT YOUR PROJECT.

FOURTH, OBTAIN AS MUCH FACTUAL INFORMATION ABOUT THE SPECIFIC OPEN SPACE AREA WHICH YOU ARE INTERESTED IN. THIS IS WHERE FACTS ARE IMPORTANT, BECAUSE THEY WILL TEND TO INFLUENCE YOUR PUBLIC. TO FIND THIS INFORMATION, STUDY SURVEY MAPS AND AERIAL PHOTOS. ENLIST THE AID OF LOCAL CONSERVATION OFFICERS AND BIOLOGISTS TO MAKE A BIOLOGICAL INVENTORY OF YOUR AREA. REMEMBER THAT THE LOCAL HISTORICAL SOCIETY MAY PROVIDE INTERESTING AND INVALUABLE INFORMATION ABOUT YOUR SITE..

AFTER YOU HAVE OBTAINED THE NEEDED BACKGROUND INFORMATION, YOU WILL NEED TO WRITE A PROPOSAL FOR LAND PRESERVATION IN A CLEAR, FACTUAL MANNER. BE SURE TO INCLUDE A MAJOR SECTION ON BENEFITS TO BE DERIVED FROM THE PROJECT. THE PUBLIC, IS INTERESTED IN THE BENEFITS WHICH THEY, AND THEIR CHILDREN, WILL DIRECTLY DERIVE BY ENDORSING YOUR PROJECT.

NOW TAKE YOUR PROJECT TO THE PUBLIC FOR ITS APPROVAL. THIS MEANS BRINGING IT TO THE PUBLIC'S ATTENTION BY RADIO, TV AND NEWSPAPER COVERAGE. HOLD LOCAL MEETINGS TO AIR YOUR PROPOSAL AND DRUM UP SUPPORT AT THE SAME TIME. AFTER YOUR CAMPAIGN HAS GAINED MOMENTUM, APPROACH POLITITIANS FOR THEIR ENDORSEMENTS. POLITICAL LEADERS WILL READILY SUPPORT PUBLIC INTEREST PROJECTS, PARTICULARLY IF THEY DEAL WITH NON-PARTISAN ISSUES. DON'T NEGLECT TO OBTAIN CONVINCING EVIDENCE OF PUBLIC SUPPORT. PETITION CAMPAIGNS FOR EXAMPLE, WILL VERY FORCEFULLY SHOW THE INTEREST OF THE PUBLIC IN YOUR PROJECT.

PRESERVATION AND MANAGEMENT OF OPEN SPACE IS A POSITIVE GOAL FOR COMMUNITIES TO WORK TOWARD.

FOCUS ATTENTION ON THE POSITIVE GOALS AND LONG TERM BENEFITS. A REALISTIC, BROAD BASED APPROACH TO OPEN SPACE PRESERVATION AND MANAGEMENT CAN BE UNIFYING EXPERIENCE FOR A COMMUNITY. GOOD LUCK IN YOUR EFFORTS!